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1 January — 31 December 1988

Volume 14

31 December 1988

**Lincoln Laboratory**

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

LEXINGTON, MASSACHUSETTS



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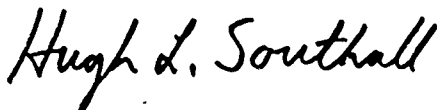
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FOR THE COMMANDER

A handwritten signature in black ink, reading "Hugh L. Southall". The signature is written in a cursive, slightly slanted style.

Hugh L. Southall, Lt. Col., USAF  
Chief, ESD Lincoln Laboratory Project Office

## FOREWORD

Volume 14 of Unclassified Publications of Lincoln Laboratory lists reports published from 1 January to 31 December 1988, as well as updated information on earlier publications.

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**TABLE OF CONTENTS**

Foreword ..... iii

Quarterly Technical Reports ..... 1

Technical Summary Report ..... 1

Miscellaneous Progress Reports ..... 3

Technical Reports ..... 5

Journal Articles ..... 7

Meeting Speeches ..... 21

Author Index ..... 35

Subject Index ..... 43

## **QUARTERLY TECHNICAL REPORTS**

### **SOLID STATE RESEARCH**

#### **DTIC No.**

1987:3	ADA192837
1987:4	ADA194708
1988:1	ADA201044
1988:2	ADA204718

## **TECHNICAL SUMMARY REPORT**

### **WEATHER RADAR STUDIES**

#### **DTIC No.**

31 March 1988

## **MISCELLANEOUS PROGRESS REPORTS**

### **DISTRIBUTED SENSOR NETWORKS (Final Report)**

	<b>DTIC No.</b>
30 September 1986	ADA204719

### **ELECTROOPTICAL DEVICES**

	<b>DTIC No.</b>
30 September 1983	ADA197070
30 September 1984	ADA193438
30 September 1985	ADA193445
30 September 1986	ADA193446

## **UNCLASSIFIED PUBLICATIONS OF LINCOLN LABORATORY (Previous Volumes)**

	<b>DTIC No.</b>
15 September 1966	AD803845
15 September 1969	AD863031
15 September 1971	AD734038
15 December 1973	AD778085
15 December 1975	ADA028523
15 December 1977	ADA062413
15 December 1979	ADA101092
15 December 1981	ADA129036
15 December 1983	ADA144354
15 December 1984	ADA161752
15 December 1985	ADA167987
15 December 1986	ADA187252
15 December 1987	ADA204729

## TECHNICAL REPORTS

TR No.				DTIC No.
787	Forced-Convection, Liquid-Cooled, Microchannel Heat Sinks	Phillips, R.J.	7 Jan. 1988	ADA193337
789	A Correlation Algorithm: The Conceptual Framework	Taff, L.G.	2 Feb. 1988	
794	An Approach to Co-Channel Talker Interference Suppression Using a Sinusoidal Model for Speech	Danisewicz, R.G. Quatieri, T.F.	5 Feb. 1988	
796	An Analytical Treatment of Resonance Effects on Satellite Orbits	Lane, M.T.	19 Aug. 1988	ADA200318
797	Applications of Mathematical Morphology to Range Imagery	Esselman, T.R. Verly, J.G.	23 Dec. 1987	ADA189316
802	Transition-Metal Oxide Superconductivity	Dionne, G.F.	20 Apr. 1988	ADA197069
803	On Random Correlation Matrices	Holmes, R.B.	28 Oct. 1988	
805	The Boltzmann Machine: A Survey and Generalization	Eggers, M.D.	8 July 1988	ADA197976
807	A Unified Approach to Electromagnetic Wave Propagation in Turbulence and the Evaluation of Multiparameter Integrals	Sasiela, R.J.	1 July 1988	ADA198062
808	Neural Network Performance on the Stochastic Exclusive-or Problem	Levine, R.Y.	8 July 1988	ADA197789
810	Implementing Artificial Neural Networks in Integrated Circuitry: A Design Proposal for Back-Propagation	Gilbert, S.L.	18 Nov. 1988	



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810	Implementing Artificial Neural Networks in Integrated Circuitry: A Design Proposal for Back-Propagation	Gilbert, S.L.	18 Nov. 1988	

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TR No.			DTIC No.
812	Microwave Power Amplifier Analysis and Design	Kushner, L.J.	16 Dec. 1988
813	Learning Algorithms for the Multilayer Perceptron	Eggers, M.D. Khuon, T.S.	28 Oct. 1988
814	Design of a Wafer-Scale Focal Plane Processor	Trepagnier, P.C.	15 Sept 1988
815	Measurements of Tilt Anisoplanatism at the Firepond Facility	Teoste, R. Daley, J.A., Jr. Capes, R.N., Jr. Alves, J.J. Zimmerman, M.D. Roberts, A.V.	18 Nov. 1988
817	Model-Based Silhouette Recognition	Van Hove, P.L. Jaenicke, R.A.	25 Nov. 1988
818	Machine Intelligence Applied to Radar Object Modeling	Aull, A.M. Gabel, R.A.	12 Oct. 1988
819	New Techniques for High-Resolution Optical Space Surveillance	Wallace, T.P.	2 Nov. 1988

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5594	Surface Acoustic Wave Devices	Oates, D.E.	Chapter 8 in <i>VLSI Electronics: Microstructure Science</i> , Vol. 9, Academic Press, 1985, pp. 290-326
5849	Wide-Band Packet Radio for Multipath Environments	Fischer, J.H. Cafarella, J.H. Bouman, C.A. Flynn, G.T. Dolat, V.S. Boisvert, R.R.	IEEE Trans. Commun., Vol. 36, No. 5, May 1988, pp. 564-576
5869	Area-Minimizing Integral Currents with Boundaries Invariant Under Polar Actions	Lander, J.C.	Trans. Am. Math. Soc., Vol. 307, No. 1, May 1988, pp. 419-429
5893	Diagnosis Using the Formal Theory of a Signal-Processing System	Nawab, H. Lesser, V. Milios, E.	IEEE Trans. Syst. Man, Cybernetics, Vol. SMC-17, No. 3, May/June 1987, pp. 369-379
5936	Serrodyne Optical Frequency Translation with High Sideband Suppression	Johnson, L.M. Cox, C.H., III	J. Lightwave Technol Vol. 6, No. 1, January 1988, pp. 109-112 ADA194638
5937	Simple Computational Technique for Determining Angle-of-Attack Convergence of Conical Re-entry Vehicles	Maurer, R.R. Hall, D.R.	J. Guid. Control Dyn., Vol. 11, No. 2, March-April 1988, pp. 179-181 ADA199244
5941	A Monolithic Hough Transform Processor Based on Restructurable VLSI	Rhodes, F.M. Dituri, J.J. Chapman, G.H. Emerson, B.E. Soares, A.M. Raffel, J.I.	IEEE Trans. Pattern Anal. Mach. Intell., Vol. 10, No. 1, January 1988, pp. 106-110 ADA192628
5955	Microwave Bulk-Acoustic-Wave Reflection-Grating Resonators	Oates, D.E. Pan, J.Y.	IEEE Trans. Ultrason. Ferroelectr. Freq. Control, Vol. 35, No. 3, May 1988, pp. 315-322 ADA197764

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5958	Correlation Matching by Finite Length Sequences	Steinhardt, A.O.	IEEE Trans. Acoust. Speech Signal Process., Vol. 36, No. 4, April 1988, pp. 545-559
5962	Cross Power and Crosstalk in Waveguide Couplers	Donnelly, J.P. Haus, H.A. Molter, L.A.	J. Lightwave Technol., Vol. 6, No. 2, February 1988, pp. 257-268 ADA194639
5964	Cepstral Domain Talker Stress Compensation for Robust Speech Recognition	Chen, Y.	IEEE Trans. Acoust. Speech Signal Process., Vol. 36, No. 4, April 1988, pp. 433-439 ADA194984
5966	Theory and Application of Adaptive Fading Memory Kalman Filters	Lee, T.S.	IEEE Trans. Circuits Syst., Vol. 35, No. 4, April 1988, pp. 474-477 ADA194627
5975	Theory of $\text{Co}^{2+}$ Exchange Isolation in Ferrimagnetic Spinels and Garnets	Dionne, G F.	J. Appl. Phys., Vol. 64, No. 3, 1 August 1988, pp. 1323-1331 ADA200153
5978	Spatial Mode Matching Efficiencies for Heterodyned GaAlAs Semiconductor Lasers	Winick, K.A. Kumar, P.	J. Lightwave Technol., Vol. 6, No. 4, April 1988, pp. 513-520 ADA194860
5981	Harmonic Retrieval of Analog Signals	Steinhardt, A.O.	IEEE Trans. Acoust. Speech Signal Process., Vol. 36, No. 1, January 1988, pp. 134-136
5995	Unsolved Problems of Celestial Mechanics	Taff, L G.	Celestial Mech., Vol. 41, 1988, pp. 411-412 ADA199651
5997	Electrical Properties of Fe-Doped Semi-insulating InP After Proton Bombardment and Annealing	Woodhouse, J.D. Donnelly, J.P. Iseler, G.W.	Solid-State Electron., Vol. 31, No. 1, January 1988, pp. 13-16 ADA188288

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| 6000 | Computational Techniques for the Matrix Pseudoinverse in Minimum Variance Reduced-Order Filtering and Control   | Kerr, T.H., III  | Chapter in <i>Control and Dynamic Systems Advances in Theory and Applications, Vol. 28: Advances in Algorithms and Computational Techniques in Dynamic Systems Control, Part 1 of 3</i> , Academic Press, NY, 1988, pp. 57-107 |
| 6004 | Injection Behavior and Modeling of 100 mW Broad Area Diode Lasers   | Abbas, G.L.<br>Yang, S.<br>Chan, V.W.S.<br>Fujimoto, J.G.  | IEEE J. Quantum Electron., Vol. 24, No. 4, April 1988, pp. 609-617<br>ADA198117  |
| 6006 | Pattern Transfer by Dry Etching Through Stencil Masks   | Pang, S.W.<br>Geis, M.W.<br>Goodhue, W.D.<br>Efremow, N.N., Jr.<br>Ehrlich, D.J.<br>Goodman, R.B.<br>Randall, J.N. | J. Vac. Sci. Technol. B, Vol. 6, No. 1, January/February 1988, pp. 249-252<br>ADA194634  |
| 6008 | Characterization of Mass-Transported p-Substrate GaInAsP/InP Buried-Heterostructure Lasers with Analytical Solutions for Electrical and Thermal Resistances | Liau, Z-L.<br>Walpole, J.N.<br>Tsang, D.Z.<br>Diadiuk, V.  | IEEE J. Quantum Electron., Vol. 24, No. 1, January 1988, pp. 36-42<br>ADA194630  |
| 6011 | Miss Distance Analysis for Command Guided Missiles  | Alpert, J.   | J. Guid. Control Dyn., Vol. 11, No. 6, November-December 1988, pp. 481-487   |
| 6014 | A Superconducting Analog Track-and-Hold Circuit   | Go, D.<br>Hamilton, C.A.<br>Lloyd, F.L.<br>Dilorio, M.S.<br>Withers, R.S.  | IEEE Trans. Electron Devices, Vol. 35, No. 4, April 1988, pp. 498-501  |

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6015	Criteria for Estimating the Impact of Series Resistance on MOSFET Performance	Cohen, S.S. Gildenblat, G. Sh.	Solid-State Electron., Vol. 31, No. 2, February 1988, pp. 261-263 ADA192627
6016A	Radiation Effects in Low-Pressure Reoxidized Nitrided Oxide Gate Dielectrics	Dunn, G.J. Jayaraman, R. Yang, W. Sodini, C.G.	Appl. Phys. Lett., Vol. 52, No. 20, 16 May 1988, pp. 1713-1715 ADA197621
6017	Measurements of Natural Radiation Effects in a Low Noise Avalanche Photodiode	Swanson, E.A. Arnau, E.R. Walther, F.G.	IEEE Trans. Nucl. Sci., Vol. NS-34, No. 6, December 1987, pp. 1658-1661
6019	Covariance Matrix Estimation Errors and Diagonal Loading in Adaptive Arrays	Carlson, B.D.	IEEE Trans. Aerosp. Electron. Syst., Vol. 24, No. 4, July 1988, pp. 397-401 ADA202327
6024	Gamma-Ray Burst Astrometry	Taff, L.G.	Astrophys. J., Vol. 326, 15 March 1988, pp. 1032-1035 ADA194635
6026A	Microwave and Millimeter-Wave Resonant-Tunneling Devices	Sollner, T.C.L.G. Brown, E.R. Le, H.O.	Linc. Lab. J., Vol. 1, No. 1, Spring 1988, pp. 89-106
6027	Monolithic GaAs/Si Opto-electronic Integrated Circuits	Choi, H-K.	Opto-Electron. Devices Technol., Vol. 2, No. 2, December 1987, pp. 265-275
6029	A Review of Excimer Laser Projection Lithography	Rothschild, M. Ehrlich, D.J.	J. Vac. Sci. Technol. B, Vol. 6, No. 1, January/February 1988, pp. 1-17 ADA194633
6030	New MBE Buffer Used to Eliminate Backgating in GaAs MESFET's	Smith, F.W. Calawa, A.R. Chen, C-L. Manfra, M.J. Mahoney, L.J.	IEEE Electron Device Lett., Vol. 9, No. 2, February 1988, pp. 77-80 ADA194636

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| 6031 | Avalanche-Induced Drain — Source Breakdown in Silicon-on-Insulator n-MOSFET's               | Young, K.K.<br>Burns, J.A.   | IEEE Trans. Electron Devices, Vol. 35, No. 4, April 1988, pp. 426-431<br>ADA194628 |
| 6032 | Electron-Beam-Pumped Two-Dimensional Semiconductor Laser Array with Tilted Mirror Resonator | Tong, F.<br>Osgood, R.M.<br>Sanchez, A.<br>Daneu, V.   | Appl. Phys. Lett., Vol. 52, No. 16, 18 April 1988, pp. 1303-1305<br>ADA202346      |
| 6035 | Simulation of GaAs p-i-n Diodes   | Gopinath, A.<br>Atwater, H.A.  | IEEE Trans. Electron Devices, Vol. 35, No. 4, April 1988, pp. 414-417<br>ADA194629 |
| 6037 | Planar Quantum Wells with Spatially Dependent Thicknesses and Al Content                    | Goodhue, W.D.<br>Zayhowski, J.J.<br>Nichols, K.B.  | J. Vac. Sci. Technol. B, Vol. 6, No. 3, May/June 1988, pp. 846-849                 |
| 6038 | The Effect of $C^{13}O_2^{16}$ on the Performance of a Sealed-Off Pulsed $CO_2$ Laser       | Marcus, S.<br>Stein, D.T.  | J. Appl. Phys., Vol. 63, No. 8, 15 April 1988, pp. 2861-2864<br>ADA197543          |
| 6040 | Pump Power Minimization for High Gain cw Laser Amplifiers                                   | Walther, A.<br>Sanchez, A.   | Appl. Opt., Vol. 27, No. 5, 1 March 1988, pp. 828-831<br>ADA192557                 |
| 6041 | Coherent Summation of Injection-Locked, Diode-Pumped Nd:YAG Ring Lasers                     | Harrison, J.<br>Rines, G.A.<br>Moulton, P.F.<br>Leger, J.R.  | Opt. Lett., Vol. 13, No. 2, February 1988, pp. 111-113                             |
| 6044 | Infrared Anisotropy of $La_{1.85}Sr_{0.15}CuO_{4-y}$  | Doll, G.L.<br>Steinbeck, J.<br>Dresselhaus, G.<br>Dresselhaus, M.S.<br>Strauss, A.J.<br>Zeiger, H.J. | Phys. Rev. B, Vol. 36, No. 16, 1 December 1987, pp. 8884-8887                      |

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| 6047 | Spatial Light Modulators Using Charge-Coupled-Device Addressing and Electro-absorption Effects in GaAs/AlGaAs Multiple Quantum Wells | Nichols, K.B.<br>Burke, B.E.<br>Aull, B.F.<br>Goodhue, W.D.<br>Gramstorff, B.F.<br>Hoyt, C.D.<br>Vera, A. | Appl. Phys. Lett., Vol. 52, No. 14, 4 April 1988, pp. 1116-1118<br>ADA194859              |
| 6048 | Classification of Patterns Using a Self-Organizing Neural Network  | Menon, M.M.<br>Heinemann, K.G.  | Neural Networks, Vol. 1, 1988, pp. 201-215<br>ADA200150                                   |
| 6052 | Optical Wavefront Measurement and/or Modification Using Integrated Optics  | Rediker, R.H.<br>Lind, T.A.<br>Burke, B.E.  | J. Lightwave Technol., Vol. 6, No. 6, June 1988, pp. 916-932                              |
| 6053 | Submicrometer Structures Fabricated by Masked Ion Beam Lithography and Dry Etching   | Pang, S.W.<br>Goodhue, W.D.<br>Geis, M.W.   | J. Electrochem. Soc., Vol. 135, No. 6, June 1988, pp. 1526-1529<br>ADA199264              |
| 6055 | Summary Abstract: Device Applications of Diamonds  | Geis, M.W.<br>Efremow, N.N., Jr.<br>Rathman, D.D.   | J. Vac. Sci. Technol. A, Vol. 6, No. 3, Pt. II, May/June 1988, pp. 1953-1954<br>ADA199315 |
| 6056 | Molecular-Beam Epitaxially Grown Spatial Light Modulators with Charge-Coupled-Device Addressing                                      | Goodhue, W.D.<br>Burke, B.E.<br>Aull, B.F.<br>Nichols, K.B.   | J. Vac. Sci. Technol. A, Vol. 6, No. 4, July/August 1988, pp. 2356-2360<br>ADA199259      |
| 6057 | Laser Patterning of Metal Oxide Superconductor Films by Reactive Solid-State Transformation  | Rothschild, M.<br>Sedlacek, J.H.C.<br>Black, J.G.<br>Ehrlich, D.J.  | IEEE Electron Device Lett., Vol. 9, No. 2, February 1988, pp. 68-70<br>ADA192630          |
| 6060 | Pt-Ir Silicide Schottky-Barrier IR Detectors   | Tsaur, B-Y.<br>Weeks, M M.<br>Pellegrini, P.W.  | IEEE Electron Device Lett., Vol. 9, No. 2, February 1988, pp. 100-102<br>ADA194637        |



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| 6061 | Sensitivity of Quantitative Vibrational Coherent Anti-Stokes Raman Spectroscopy to Saturation and Stark Shifts             | Péalat, M.<br>Lefebvre, M.<br>Taran, J.-P. E.<br>Kelley, P.L.  | Phys. Rev. A, Vol. 38,<br>No. 4, 15 August 1988,<br>pp. 1948-1965<br>ADA202334            |
| 6062 | Residual Infrared Absorption in As-Grown and Annealed Crystals of $\text{Ti:Al}_2\text{O}_3$                               | Aggarwal, R.L.<br>Sanchez, A.<br>Stuppi, M.M.<br>Fahey, R.E.<br>Strauss, A.J.<br>Rapoport, W.R.<br>Khattak, C.P. | IEEE J. Quantum<br>Electron., Vol. 24,<br>No. 6, June 1988,<br>pp. 1003-1008<br>ADA200156 |
| 6064 | Low-Threshold GaAs/AlGaAs Lasers Grown on Si by Organometallic Vapor Phase Epitaxy   | Choi, H-K.<br>Lee, J.W.<br>Salerno, J.P.<br>Connors, M.K.<br>Tsaun, B-Y.<br>Fan, J.C.C.                          | Appl. Phys. Lett., Vol. 52,<br>No. 14, 4 April 1988,<br>pp. 1114-1115<br>ADA194858        |
| 6065 | Reversible Laser Chemically Induced Phase Transformations in Thin-Film $\text{Ba}_2\text{YCu}_3\text{O}_x$ Superconductors | Rothschild, M.<br>Sedlacek, J.H.C.<br>Black, J.G.<br>Ehrlich, D.J.   | Appl. Phys. Lett., Vol. 52,<br>No. 5, 1 February 1988,<br>pp. 404-406<br>ADA192629        |
| 6066 | Stellar Scintillation Technique for the Measurement of Tilt Anisoplanatism   | Winick, K.A.<br>Marquis, D.vL.   | J. Opt. Soc. Am. A, Vol. 5,<br>No. 11, November 1988,<br>pp. 1929-1936                    |
| 6069 | Optical Nonlinearities in $\text{Al}_x\text{Ga}_{1-x}\text{As/GaAs}$ Asymmetric Coupled Quantum Wells                      | Le, H.Q.<br>Hryniewicz, J.V.<br>Goodhue, W.D.<br>Mims, V.A.  | Opt. Lett., Vol. 13, No. 10,<br>October 1988,<br>pp. 859-861<br>ADA202404                 |
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| 6072 | Using Electrical Probes to Measure Ion Velocities in Pyrotechnic Plasmas   | Cohen, D.L.  | J. Spacecr. Rockets,<br>Vol. 25, No. 4,<br>July-August 1988,<br>pp. 315-317               |

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| 6073 | Coherent Addition of AlGaAs Lasers Using Microlenses and Diffractive Coupling   | Leger, J.R.<br>Scott, M.L.<br>Veldkamp, W.B.                  | Appl. Phys. Lett., Vol. 52, No. 21, 23 May 1988, pp. 1771-1773<br>ADA197622   |
| 6074 | Planar Vias Through Si <sub>3</sub> N <sub>4</sub> Fabricated by Focused Ion Beam Implantation  | Melngailis, J.<br>Herndon, T.O.<br>Shepard, M.I.<br>Lezec, H. | J. Vac. Sci. Technol. B, Vol. 6, No. 3, May/June 1988, pp. 1022-1025<br>ADA199263   |
| 6075 | Semiconductor Integrated Optic Devices  | Leonberger, F.J.<br>Donnelly, J.P.                            | Chapter 6 in <i>Springer Series in Electronics and Photonics</i> , Vol. 26, <i>Guided-Wave Optoelectronics</i> . Springer-Verlag, Berlin, 1988, pp. 317-395 |
| 6076 | Fundamental Oscillations Up to 200 GHz in Resonant Tunneling Diodes and New Estimates of Their Maximum Oscillation Frequency from Stationary-State Tunneling Theory | Brown, E.R.<br>Goodhue, W.D.<br>Sollner, T.C.L.G.             | J. Appl. Phys., Vol. 64, No. 3, 1 August 1988, pp. 1519-1529<br>ADA200154   |
| 6077 | New Principle of Statistical Estimation   | Taff, L.G.  | Phys. Rev. A, Vol. 37, No. 12, 15 June 1988, pp. 4943-4949<br>ADA199314   |
| 6078 | Quantitative Analysis of the Effect of Disorder-Induced Mode Coupling on Infrared Absorption in Silica  | Kirk, C.T., Jr.   | Phys. Rev. B, Vol. 38, No. 2, 15 July 1988, pp. 1255-1273<br>ADA199313  |
| 6079 | High-Performance InGaAsP/InP Buried-Heterostructure Lasers and Arrays Defined by Ion-Beam-Assisted Etching  | Yap, D.<br>Liau, Z-L.<br>Tsang, D.Z.<br>Walpole, J.N.         | Appl. Phys. Lett., Vol. 52, No. 18, 2 May 1988, pp. 1464-1466<br>ADA194640  |
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- |      |  |   |  |
|------|--|---|--|
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7369	Reduction of Peak/rms Ratio of Speech by Amplitude Compression and Quadratic Phase Dispersion	Lynch, J.T.	J. Audio Eng. Soc., Vol. 36, No. 3, March 1988, pp. 147-152
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7442	Motion in the Equatorial Plane of an Oblate Primary	Taff, L.G.	<i>Astrodynamics 1987</i> , Vol. 65, <i>Advances in the Astronautical Sciences</i> , American Astronautical Soc., 1988, pp. 699-712 ADA197891
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## Meeting Speeches

### MS No.

7672	Computationally Efficient Sine-Wave Synthesis and Its Application to Sinusoidal Transform Coding	McAulay, R.J. Quatieri, T.F.	ICASSP '88, Proc. IEEE Intl. Conf. on Acoustics, Speech, and Sig. Proc., Vol. I, Speech Processing, 11-14 April 1988, pp. 370-373
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## MS No.

- |       |  |   |   |
|-------|--|---|---|
| 7717  | New Reactor Design for Growth of InP and Related Alloys  | Groves, S.H.<br>Palmateer, S.C.<br>Caunt, J.W.<br>Hovey, D.L.                   | J. Cryst. Growth, Vol. 93, 1988, pp. 242-247  |
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## Meeting Speeches

### MS No.

7768	Infrared Applications of Diffraction Optical Elements	Swanson, G.J. Veldkamp, W.B.	SPIE, Vol. 883, <i>Holographic Optics: Design and Applications</i> , 13-14 January 1988, pp. 155-162
7770	Monolithic GaAs/Si Integration	Turner, G.W. Choi, H-K. Mattia, J.P. Chen, C-L. Egash, S.J. Tsaur, B-Y.	Materials Research Society Symp. Proc., Vol., 116, 1988, pp. 179-192
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7790	Astigmatic Wavefront Correc- tion of a Gain-Guided Laser Diode Array Using Anamorphic Diffraction Microlenses	Leger, J.R. Scott, M.L. Bundman, P. Griswold, M.P.	SPIE, Vol. 884, <i>Computer- Generated Holography II</i> , 11-12 January 1988, pp. 82-89 ADA198118
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## MS No.

- |       |  |   |   |
|-------|--|---|---|
| 7843  | InGaAs/GaAs and GaAs/AlGaAs Multiple-Quantum-Well Spatial Light Modulators                     | Aull, B.F.<br>Nichols, K.B.<br>Goodhue, W.D.<br>Burke, B.E.                                   | Spatial Light Modulators and Applications Topical Mtg., 1988 Technical Digest Series, Vol. 8, pp. 92-95 |
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## Meeting Speeches

### MS No.

7911	Coherent Arrays of InGaAsP/InP Buried-Heterostructure Lasers	Yap, D. Walpole, J.N. Liau, Z-L.	11th IEEE Intl. Semiconductor Laser Conf., Conf. Digest, 29 August — 1 September 1988, pp. 20-21
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7930	Tomographic Image Reconstruction from Laser Radar Reflective Projections	Marino, R.M. Capes, R.N., Jr. Keicher, W.E. Kulkarni, S.R. Parker, J.K. Swezey, L.W. Senning, J.R. Reiley, M.F. Craig, E.B.	SPIE, Vol. 999, <i>Laser Radar III</i> , 6-7 September 1988, pp. 248-268

## MS No.

- |       |  |  |  |
|-------|--|--|--|
| 7942B | Coherent Optical Inter-satellite Crosslink Systems   | Kaufmann, J.E.<br>Chan, V.W.S.   | MILCOM '88 Conf.<br>Record, Vol. 2,<br>23-26 October 1988,<br>pp. 533-540  |
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## Meeting Speeches

### MS No.

8109	Some Applications of Mathematical Morphology to Range Imagery	Verly, J.G. Esselman, T.R.	Electronic Imaging '88, 3-6 October 1988, pp. 280-285
8147	Robust Hoo Control Design for Systems with Structured Parameter Uncertainty	Madiwale, A.N. Haddad, W.M. Bernstein, D.S.	Proc. 27th Conf. on Decision and Control, 7-9 December 1988, pp. 965-972

## AUTHOR INDEX

- Abbas, G.L., JA-6004
- Abouzahra, M.D., JA-6124, MS-7766
- Aggarwal, R.L., JA-6062, JA-6086,  
JA-6159, JA-6191, MS-7666
- Alexander, S.B., MS-7952
- Allen, G.A., MS-7752
- Alpert, J., JA-6011
- Alves, J.J., TR-815
- Anderson, A.C., JA-6083, MS-7491A
- Anderson, K.K., JA-6163
- Antoniadis, D.A., JA-6121
- Arnau, E.R., JA-6017
- Atwater, H.A., JA-6035
- Aull, A.M., TR-818
- Aull, B.F., JA-6047, JA-6056,  
MS-7526, MS-7581, MS-7843
- Bailey, R.J., JA-6114, JA-6155,  
MS-7869A
- Batman, D., JA-6126
- Bedair, S.M., JA-6177
- Berger, R., MS-7683C
- Bernstein, D.S., MS-8147
- Betts, G.E., MS-7503, MS-7957
- Black, J.G., JA-6057, JA-6065,  
JA-6084, JA-6134, JA-6197
- Boisvert, R.R., JA-5849
- Bondurant, R.S., MS-7952
- Bouman, C.A., JA-5849
- Bozler, C.O., MS-7570, MS-7754
- Brown, E.R., JA-6026A, JA-6076,  
JA-6104, MS-7584, MS-7838
- Brown, R.A., MS-7727
- Brown, R.T., MS-7880
- Buczek, C., MS-7513
- Bufton, J.L., MS-7640
- Bundman, P., MS-7790
- Bunis, J.L., MS-7853
- Burke, B.E., JA-6047, JA-6052,  
JA-6056, MS-7526, MS-7581,  
MS-7843
- Burns, J.A., JA-6031, JA-6090
- Cafarella, J.H., JA-5849
- Calawa, A.R., JA-6030, MS-7557
- Campbell, S.D., MS-7716
- Cantella, M.J., JA-6105
- Canter, J.M., JA-6116
- Capes, R.N., Jr., TR-815, MS-7930
- Cardullo, M.J., MS-7589
- Carlson, B.D., JA-6019
- Carter, G.M., JA-6109, JA-6148
- Caunt, J.W., MS-7717, MS-7727
- Chan, V.W.S., JA-6004, JA-6167,  
MS-7942B, MS-7952
- Chapman, G.H., JA-5941, JA-6116
- Chauchard, E.A., MS-7393
- Chen, C.K., MS-7626
- Chen, C-L., JA-6030, JA-6134,  
MS-7557, MS-7770, MS-7838

## Author Index

- Chen, Y., JA-5964
- Cheo, P.K., MS-7880
- Choi, H-K., JA-6027, JA-6064,  
JA-6151, MS-7770
- Chu, P.L., MS-7663
- Clifton, B.J., MS-8106
- Cohen, D.L., JA-6072
- Cohen, S.S., JA-6015, JA-6116,  
JA-6132
- Colao, A.A., MS-7952
- Connors, M.K., JA-6064
- Correa, C.A., JA-6104
- Coster, A.J., JA-6199
- Cox, C.H., III, JA-5936, MS-7957
- Craig, E.B., JA-6088, MS-7930
- Daley, J.A., Jr., TR-815
- Daneu, V., JA-6032
- Danisewicz, R.G., TR-794, MS-7648
- Davis, W.R., Jr., MS-7515
- Diadiuk, V., JA-6008, JA-6089,  
MS-7393, MS-7444, MS-7660,  
MS-7912
- Dionne, G.F., TR-802, JA-5975,  
MS-7586, MS-7752
- Ditmer, G.A., MS-7859
- Dituri, J.J., JA-5941
- DiIorio, M.S., JA-6014, JA-6083
- Dolat, V.S., JA-5849, JA-6139,  
MS-7587
- Doll, G.L., JA-6044, JA-6142
- Donnelly, J.P., JA-5962, JA-5997,  
JA-6075, JA-6114, JA-6155,  
JA-6163, MS-7553, MS-7869A
- Doran, S.P., JA-6134
- Dresselhaus, G., JA-6044, JA-6142
- Dresselhaus, M.S., JA-6044, JA-6142
- Dudgeon, D.E., MS-7641
- Dumanian, A.J., MS-7766
- Dunn, G.J., JA-6016A, JA-6115
- Efremow, N.N., Jr., JA-6006, JA-6055
- Eggers, M.D., TR-805, TR-813
- Eglash, S.J., MS-7770
- Ehrlich, D.J., JA-6006, JA-6029,  
JA-6057, JA-6065, JA-6084,  
JA-6134, JA-6139, JA-6153,  
JA-6197, MS-7587, MS-7623,  
MS-7623A, MS-7815
- Eklund, P.C., JA-6142
- Emerson, B.E., JA-5941
- Eng, R.S., JA-6091, MS-7655, MS-7853,  
MS-7867, MS-7880, MS-8048,  
MS-8094
- Esselman, T.R., TR-797, MS-8109
- Everett, P.N., MS-7758
- Fahey, R.E., JA-6062, JA-6086,  
MS-7666
- Fan, J.C.C., JA-6064
- Fenn, A.J., MS-7417
- Fischer, J.H., JA-5849
- Fitzgerald, W.D., MS-7752



- Flynn, G.T., JA-5849
- Forman, S.E., JA-6146, MS-7515
- Freed, C., MS-7325B, MS-7325C,  
MS-8094
- Fujimoto, J.G., JA-6004, JA-6109,  
JA-6148
- Gabel, R.A., TR-818
- Gaposchkin, E.M., JA-6199
- Garcia, J.G., MS-7750B
- Geis, M.W., JA-6006, JA-6053,  
JA-6055, MS-7626, MS-7859
- Gilbert, I.H., JA-6140
- Gilbert, S.L., TR-810
- Gildenblat, G.Sh., JA-6015
- Gilson, W.H., MS-7924
- Go, D., JA-6014
- Gold, B., MS-7667, MS-7668
- Goodhue, W.D., JA-6006, JA-6037,  
JA-6047, JA-6053, JA-6056,  
JA-6069, JA-6076, JA-6102,  
JA-6104, JA-6153, JA-6177,  
MS-7526, MS-7553, MS-7581,  
MS-7584, MS-7815, MS-7838,  
MS-7843
- Goodman, R.B., JA-6006, JA-6153,  
MS-7815
- Gopinath, A., JA-6035
- Gramstorff, B.F., JA-6047, MS-7526
- Green, J.B., MS-7491A
- Grimm, J.G., MS-7853, MS-8094
- Griswold, M.P., MS-7790
- Groves, S.H., MS-7717
- Gupta, K.C., JA-6124, MS-7766
- Haddad, W.M., MS-8147
- Hall, D.R., JA-5937
- Hamilton, C.A., JA-6014
- Harris, N.W., MS-7853, MS-8094
- Harrison, J., JA-6041
- Hashemi, M., JA-6177
- Haus, H.A., JA-5962, JA-6163
- Heinemann, K.G., JA-6048
- Herndon, T.O., JA-6074
- Higgs, C., MS-7497A
- Hodsdon, D.M., MS-7629
- Hollis, M.A., MS-7553, MS-7570,  
MS-7754
- Holmes, R.B., TR-803
- Holz, M.K.O., JA-6162
- Horton, R.F., JA-6157
- Hovey, D.L., MS-7717
- Hoyt, C.D., JA-6047, MS-7526
- Hryniewicz, J.V., JA-6069
- Huang, J.C-M., MS-7557
- Huang, W.Y., MS-7668
- Ide, Y., JA-6177
- Im, J.S., MS-7626
- Iseler, G.W., JA-5997
- Ismail, K., JA-6121

## Author Index

- Jaenicke, R.A., TR-817
- Jayaraman, R., JA-6016A
- Jayaraman, V., MS-7750B
- Jeys, T.H., MS-7606
- Johnson, D.H., MS-7649
- Johnson, G.D., JA-6153, MS-7815
- Johnson, L.M., JA-5936, JA-6106,  
MS-7503, MS-7954, MS-7957
- Kachelmyer, A.L., MS-7886, MS-7889,  
MS-8048
- Karulkar, P.C., JA-6127
- Kaufmann, J.E., MS-7942B, MS-7952
- Keicher, W.E., MS-7930
- Kelley, P.L., JA-6061, JA-6123
- Kerr, T.H., III, JA-6000
- Khattak, C.P., JA-6062
- Khuon, T.S., TR-813
- Killinger, D.K., MS-7607, MS-7640
- Kintzer, E.S., MS-7750B
- Kirk, C.T., Jr., JA-6078
- Klamkin, M.S., JA-6126
- Klick, D.I., JA-6088
- Knight, F.K., JA-6088
- Kulkarni, S.R., JA-6088, MS-7930
- Kumar, P., JA-5978
- Kushner, L.J., TR-812, MS-7570,  
MS-7754
- Lander, J.C., JA-5869
- Lane, M.T., TR-796
- Lax, B., JA-6091, MS-7655, MS-7867
- Le, H.Q., JA-6026A, JA-6069
- LeClair, R.A., JA-6146
- Lee, C.H., MS-7393
- Lee, C-T., JA-6090
- Lee, E., MS-7952
- Lee, J.W., JA-6064
- Lee, T.S., JA-5966
- Lefebvre, M., JA-6061
- Leger, J.R., JA-6041, JA-6073,  
JA-6162, MS-7790
- Lehmann, G.W., JA-6142
- Leonberger, F.J., JA-6075
- Lesser, V., JA-5893
- Levine, R.Y., TR-808
- Lezec, H., JA-6074
- Lezec, H.J., JA-6121
- Liau, Z-L., JA-6008, JA-6079,  
JA-6089, JA-6131, MS-7444,  
MS-7634, MS-7660, MS-7911,  
MS-7912
- Lind, T.A., JA-6052
- Lippmann, R.P., JA-6141, MS-7667,  
MS-7668, MS-7669, MS-7670,  
MS-7683C, MS-7785
- Lloyd, F.L., JA-6014
- Lucente, M., JA-6109, JA-6148
- Lucey, R.F., Jr., JA-6191
- Lynch, J.T., MS-7369
- Lyszczarz, T.M., JA-6153, MS-7815

- Madiwale, A.N., MS-7952, MS-8147
- Mahoney, L.J., JA-6030, JA-6121,  
JA-6134, MS-7557
- Manfra, M.J., JA-6030, JA-6155,  
MS-7557
- Mann, J.R., MS-7683C
- Marcus, S., JA-6038
- Marino, R.M., JA-6088, JA-6091,  
MS-7655, MS-7867, MS-7930
- Marquis, D.vL., JA-6066
- Martin, E.A., MS-7669, MS-7670,  
MS-7671
- Martin, P.F., MS-7952
- Mathews, R.H., MS-7570, MS-7754
- Mattia, J.P., JA-6151, MS-7770
- Maurer, R.R., JA-5937
- McAllister, G., MS-7513
- McAulay, R.J., JA-6181, MS-7653,  
MS-7672
- McClung, S.K., MS-7673
- McDermott, B.T., JA-6177
- McElroy, D.R., Jr., MS-7425A
- McLellan, E.J., MS-7640
- Melngailis, J., JA-6074, JA-6121
- Menon, M.M., JA-6048
- Menyuk, N., MS-7607
- Merritt, M.W., MS-7554
- Milios, E., JA-5893
- Mims, V.A., JA-6069
- Molter, L.A., JA-5962
- Morton, R., MS-7513
- Moulton, P.F., JA-6041
- Mourou, G.A., JA-6102
- Mull, D.E., JA-6089
- Murphy, R A., MS-7570
- Murphy, R.J., JA-6134
- Nawab, H., JA-5893
- Nett, H., MS-8106
- Niblack, W.K., MS-7755
- Nicholls, J.T., JA-6142
- Nichols, K.B., JA-6037, JA-6047,  
JA-6056, MS-7526, MS-7570,  
MS-7581, MS-7754, MS-7843
- Norton, M.A., MS-7497A
- Novak, L.M., MS-7589
- Oates, D.E., JA-5594, JA-5955,  
MS-7582
- O'Donnell, R.G., MS-8094
- Olson, T., MS-7513
- Olsson, D.L., MS-7570
- Orphanoudakis, S., MS-7924
- Osgood, R.M., JA-6032
- Palmateer, S.C., MS-7717
- Pan, J.Y., JA-5955, MS-7582
- Pang, S.W., JA-6006, JA-6053,  
JA-6084, JA-6153, JA-6197,  
MS-7553, MS-7815
- Parker, J.K., JA-6088, MS-7853,  
MS-7930

## Author Index

- Patnaik, S., MS-7727
- Paul, D.B., MS-7670, MS-7671
- Péalat, M., JA-6061
- Peli, T., MS-7681
- Pellegrini, P.W., JA-6060, JA-6158
- Phillips, R.J., TR-787, JA-6118
- Pillsbury, A.D., MS-7750B, MS-7913, MS-7952
- Pohlig, S.C., MS-7585, MS-7674
- Polychronopoulos, G.H., JA-6200
- Quatieri, T.F., TR-794, JA-6181, MS-7648, MS-7653, MS-7672
- Quddus, M.A., MS-7570
- Rabe, S., MS-7570
- Raffel, J.I., JA-5941, MS-7683C, MS-7783
- Randall, J.N., JA-6006
- Rao, A.M., JA-6142
- Rapoport, W.R., JA-6062
- Rathman, D.D., JA-6055, MS-7755, MS-7859
- Rauschenbach, K., JA-6114, MS-7869A
- Rediker, R.H., JA-6052
- Reiley, M.F., MS-7925, MS-7930
- Rhodes, F.M., JA-5941
- Richardson, M.F., MS-7913
- Rines, G.A., JA-6041
- Roberts, A.V., TR-815
- Rothschild, M., JA-6029, JA-6057, JA-6065, JA-6084, JA-6197, MS-7623, MS-7623A
- Roussell, H.V., JA-6106, MS-7954
- Ryan-Howard, D.P., JA-6191
- Salerno, J.P., JA-6064
- Sanchez, A., JA-6032, JA-6040, JA-6062, JA-6086
- Sasiela, R.J., TR-807
- Schultz, K.I., MS-7925
- Schulz, P.A., JA-6070, JA-6159, MS-7673
- Scott, M.L., JA-6073, MS-7790
- Sechtin, M.B., MS-7589
- Sedlacek, J.H.C., JA-6057, JA-6065, JA-6139, MS-7587
- Semprucci, M.D., JA-6111
- Senning, J.R., JA-6088, MS-7930
- Shatz, M.P., JA-6200
- Shepard, M.I., JA-6074, JA-6121
- Simpson, G.A., JA-6114, MS-7869A
- Smith, D.K., MS-7859
- Smith, F.W., JA-6030, MS-7557
- Smythe, D.L., MS-7859
- Soares, A.M., JA-5941
- Sodini, C.G., JA-6016A
- Sollner, T.C.L.G., JA-6026A, JA-6076, JA-6102, JA-6104, MS-7563, MS-7838
- Spooner, F.H., MS-7557
- Stein, D.T., JA-6038

- Steinbeck, J., JA-6044
- Steinhardt, A.O., JA-5958, JA-5981
- Stephens, T., MS-7515
- Strauss, A.J., JA-6044, JA-6062,  
JA-6086, JA-6142, MS-7666
- Stuppi, M.M., JA-6062
- Swanson, E.A., JA-6017, MS-7952
- Swanson, G.J., JA-6162, MS-7768
- Swezey, L.W., MS-7925, MS-7930
- Taff, L.G., TR-789, JA-5995,  
JA-6024, JA-6077, JA-6094,  
MS-7442
- Taran, J.-P.E., JA-6061, JA-6123
- Taylor, J.A., MS-7913
- Teoste, R., TR-815
- Thompson, C.V., MS-7626
- Tomita, H., MS-7626
- Tong, F., JA-6032
- Trepagnier, P.C., TR-814
- Trubiano, R., JA-6158
- Tsang, D.Z., JA-6008, JA-6079,  
MS-7634
- Tsaur, B.-Y., JA-6060, JA-6064,  
JA-6083, JA-6151, JA-6158,  
MS-7770
- Turner, G.W., JA-6151, MS-7393,  
MS-7770
- Tussey, B.K., JA-6088
- Van Hove, P.L., TR-817
- Veldkamp, W.B., JA-6073, JA-6162,  
MS-7768
- Vera, A., JA-6047, MS-7526, MS-7570
- Verly, J.G., TR-797, MS-7641,  
MS-8109
- Wall, K.F., JA-6159, MS-7666
- Wallace, T.P., TR-819
- Walpole, J.N., JA-6008, JA-6079,  
JA-6089, JA-6131, MS-7444,  
MS-7660, MS-7911, MS-7912
- Walther, A., JA-6040
- Walther, F.G., JA-6017
- Wang, C.A., JA-6114, JA-6163,  
MS-7727, MS-7869A
- Weeks, M.M., JA-6060, JA-6158
- Weiss, J.A., MS-7752
- Welford, D., MS-7913
- Whitaker, J.F., JA-6102
- Williams, B.D., MS-7641
- Winick, K.A., JA-5978, JA-6066
- Winkler, I.C., MS-7497A
- Wirzbicki, M.A., JA-6127
- Withers, R.S., JA-6014, MS-7491A
- Wolfson, M.M., JA-6120, MS-7588
- Wong, D.M., MS-7853
- Woodhouse, J.D., JA-5997, JA-6155,  
JA-6163
- Wyatt, P.W., JA-6115, JA-6132

## **Author Index**

Yang, S., JA-6004

Yang, W., JA-6016A

Yap, D., JA-6079, JA-6131, MS-7660,  
MS-7911

Yew, T-R., JA-6158

Young, K.K., JA-6031

Zayhowski, J.J., JA-6037, MS-7859

Zeiger, H.J., JA-6044

Zhang, J.M., JA-6142

Zimmerman, M.D., TR-815

Zollars, B.G., MS-7758

## SUBJECT INDEX

ABERRATION FREE PROJECTION OPTICS MS-7623	AIRCRAFT ACCIDENTS JA-6120
ACOUSTIC NOISE MS-7672	AIRY FUNCTION JA-6200
ACOUSTIC SIGNAL PROCESSING JA-5893	ALGORITHMS JA-5958, JA-5964, MS-7667, MS-7668, MS-7674, MS-7683C
ACOUSTOOPTIC MODULATOR MS-8048	ALIASING NOISE MS-7585
ACTUATORS MS-7515	ALLOPHONE MS-7667
A/D CONVERTER JA-5981	ALUMINUM JA-6037, JA-6118
ADAPTIVE ARRAY MS-7417	ALUMINUM ARSENIDE MS-7584, MS-7838
ADAPTIVE BEAM FORMING JA-6019	ALUMINUM GALLIUM ARSENIDE JA-6047, JA-6064, JA-6069, JA-6073, JA-6109, JA-6114, JA-6148, JA-6163, MS-7526, MS-7581, MS-7790
ADAPTIVE FADING MEMORY JA-5966	AMPLIFIED SPONTANEOUS EMISSION JA-6159, MS-7666
ADAPTIVE FILTERING JA-5966	AMPLIFIERS MS-7666
ADAPTIVE NONLINEAR ALGORITHM MS-7681	AMPLITUDE COMPRESSION MS-7369
ADAPTIVE NULLING MS-7417, MS-7585	AMPLITUDE MODULATION MS-8048
ADAPTIVE OPTICS TR-819, JA-6123	AMPLITUDE TRIMMING JA-6139
ADIABATIC INVARIANTS JA-6077	ANALOG CIRCUITS MS-7783
ADVANCED COMMUNICATIONS TECHNOLOGY SATELLITE MS-7952	ANALOG DATA JA-5981
AIRBORNE RADAR MS-7417	

## Subject Index

ANALOG DEVICE TECHNOLOGY  
JA-6014

ANALOG OPTICAL  
COMMUNICATION LINK  
JA-6106

ANALOG SIGNALS  
JA-5981

ANALOG SYSTEM  
MS-7634

ANALYSIS/SYNTHESIS SYSTEM  
JA-6181

ANAMORPHIC DIFFRACTIVE  
MICROLENSSES  
MS-7790

ANGLE OF ATTACK  
JA-5937

ANGULAR RATES  
JA-5966

ANNEALING  
JA-5997, JA-6062

ANODE  
TR-796

ANTENNAS  
MS-7417

ANTIREFLECTION COATINGS  
MS-8094

APPEARANCE MODELS  
MS-7641

ARGON  
MS-8094

ARGON COATED CADMIUM  
TELLURIDE  
MS-8094

ARGON ION BEAM  
MS-7553

ARGON ION LASER  
JA-6070, MS-7673

ARSENIC  
JA-6030, JA-6062

ARTIFICIAL INTELLIGENCE  
TR-818

ARTIFICIAL NEURAL NETWORK  
TR-810, MS-7667, MS-7668

ASSOCIATIVE MEMORY  
TR-805

ASTIGMATIC WAVEFRONT CORRECTION  
MS-7790

ASTROMETRY  
JA-6024

ASYMMETRIC COUPLED QUANTUM WELLS  
JA-6069

ATMOSPHERIC ABSORPTION  
JA-6038

ATMOSPHERIC BACKSCATTER  
MS-7607

ATMOSPHERIC COMPENSATION  
MS-7497A

ATMOSPHERIC DENSITY  
JA-5937

ATMOSPHERIC DRAG  
JA-6199

ATMOSPHERIC MEASUREMENTS  
TR-815

ATMOSPHERIC PRESSURE  
MS-7717

ATMOSPHERIC SCATTERING  
JA-6123

ATMOSPHERIC TURBULENCE  
TR-819



- ATOMIC LAYER EPITAXY  
JA-6177
- AUDIO PREPROCESSING  
MS-7653
- AUDIO SIGNALS  
MS-7653
- AUTODYNE SIGNATURES  
MS-7925
- AUTOMATIC DETECTION  
MS-7554
- AUTOMATIC SPEECH RECOGNITION  
JA-5964, MS-7667
- AVALANCHE BREAKDOWN  
JA-6031
- AVALANCHE PHOTODIODES  
JA-6017
- AVIATION HAZARDS  
JA-6120
- AVIATION WEATHER HAZARDS  
MS-7588
- BACK-PROPAGATION  
TR-810
- BACKGATING  
JA-6030, MS-7557
- BALLISTIC ELECTRONS  
MS-7584
- BANDPASS FILTERS  
JA-5594
- BANDPASS LIMITER  
MS-7957
- BARIUM YTTRIUM COPPER OXIDE  
JA-6057, JA-6065
- BEAM QUALITY  
MS-7497A
- BEAM STEERING  
JA-6146, MS-7515, MS-7952
- BERYLLIUM  
JA-6146
- BERYLLIUM MIRROR  
JA-6146
- BINARY GRATINGS  
JA-6041
- BINARY OPTICS  
JA-6162
- BINARY PHASE-SHIFT KEYING  
MS-7889
- BINARY STARS  
TR-815, JA-6066
- BLACKBOARD ARCHITECTURE  
TR-818
- BOLTZMANN MACHINE  
TR-805
- BOUNDARY VALUES  
JA-5869
- BREAKDOWN VOLTAGES  
JA-6031
- BROAD AREA DIODE LASER  
JA-6004, JA-6148
- BROADBAND MODULATORS  
JA-6091
- BROADBAND NOISE  
JA-5981
- BROADBAND SUPERLUMINESCENT  
DIODE  
JA-5936
- BUFFER  
JA-6030, MS-7557
- BUFFER LAYERS  
JA-6064, MS-7557

## Subject Index

BUFFERED DIGITAL OUTPUT  
MS-7491A

BULK ACOUSTIC WAVE  
JA-5955, MS-7582

BURIED HETEROSTRUCTURE  
JA-6008, JA-6079, JA-6089, JA-6131,  
MS-7911, MS-7912

CADMIUM SULFIDE  
JA-6032

CADMIUM TELLURIDE  
JA-6091, MS-8094

CAPACITANCE  
JA-6134

CAPACITORS  
JA-6134

CARBON DIOXIDE ISOTOPES  
JA-6038

CARBON DIOXIDE LASER RADAR  
SYSTEM  
MS-7886

CARBON DIOXIDE LASERS  
JA-6038, JA-6091, JA-6162, JA-6191,  
MS-7325B, MS-7325C, MS-7640,  
MS-8048, MS-8094

CATION ORDERING  
TR-802

CELESTIAL MECHANICS  
JA-5995

CENTROID TRACKING  
TR-789

CEPSTRAL COEFFICIENTS  
JA-5964

CEPSTRAL DOMAIN STRESS  
COMPENSATION  
JA-5964

CESIUM NITRATE  
JA-6072

CHANNEL MISMATCH  
MS-7674

CHARACTER RECOGNITION  
JA-6048

CHARGE TRAPPING  
JA-6090

CHARGE-COUPLED DEVICES  
JA-6047, JA-6056, MS-7526, MS-7581,  
MS-7783, MS-7843

CHEMICAL ETCHING  
JA-6089

CHIMNEY REACTOR  
MS-7717

CHLORINE  
MS-7553, MS-7587

CHROMATIC ABERRATION  
MS-7623

CIRCUIT DESIGN  
MS-7683C

CIRCUIT TUNING  
JA-6134

CIRCUITRY  
JA-6030

CIRCUITS AND COMPONENTS  
JA-6029

CIRCULAR SECTOR SHAPED  
MS-7766

CLOSED LOOP  
MS-7952

CLOSELY SPACED FREQUENCIES  
TR-794

CLUTTER CANCELLATION  
MS-7417

CLUTTER MODELS

MS-7589

CMOS

TR-810, JA-6116

COBALT

JA-5975

COBALT ANISOTROPY AND  
RELAXATION

JA-5975

COBALT MAGNESIUM FLUORIDE  
LASER

MS-7607

CO-CHANNEL TALKER  
INTERFERENCE SUPPRESSION

TR-794, MS-7648

COHERENT ANTI-STOKES RAMAN  
SCATTERING

JA-6061

COHERENT ARRAY

MS-7911

COHERENT LASER RADAR

MS-7886

COHERENT LASERS

JA-6162

COHERENT OPTICAL  
COMMUNICATION SYSTEMS

MS-7942B, MS-7952

COHERENT RANGE DOPPLER  
LASER RADAR

MS-7886

COHERENT SUMMATION

JA-6041

COMBINATORIAL COMPLEXITY

TR-817

COMMAND GUIDANCE

JA-6011

COMMUNICATION SATELLITES

MS-7425A, MS-7629

COMPENSATION

MS-7587

COMPENSATION HEATER

TR-787

COMPLEX IMAGING

JA-6048

COMPOSITE MATERIALS

MS-7393

COMPOSITIONAL DISORDERING

JA-6163

COMPUTATIONAL TECHNIQUE

JA-6000

COMPUTER VISION

TR-797, TR-817, MS-7641

CONDITION NUMBER

TR-803

CONICAL HORN ANTENNA

MS-8106

CONSTANT TRANSCONDUCTANCE

TR-812

CONTENT VARIATION

JA-6037

CONTINENTAL U.S.

JA-6120, MS-7588

CONTINUOUS SPEECH RECOGNITION

MS-7671

CONTINUOUS WAVE

JA-6040

CONTINUOUS WAVE OPERATION

MS-7444

## Subject Index

CONTINUOUSLY TUNABLE LASER  
MS-7607

CONTROL SYSTEMS  
MS-8147

CONTROL SYSTEMS ENGINEERING  
MS-8147

CONVERSION EFFICIENCIES  
JA-6032, MS-7853

CONVOLVER  
JA-5594

COOPERATIVE HUNTSVILLE  
METEOROLOGICAL EXPERIMENT  
MS-7588

COPPER PEROVSKITES  
TR-802

CORNER EXTRACTION  
MS-7681, MS-8109

CORRELATION  
TR-789

CORRELATION MATCHING  
JA-5958

COUPLED MICROCAVITIES  
JA-6162

COUPLED QUANTUM WELLS  
JA-6069

COUPLERS  
JA-5962

COVALENT BONDING  
TR-802

COVARIANCE MATRIX  
JA-6019

CRITICAL TEMPERATURE  
TR-802

CROSS POWER  
JA-5962

CROSSLINK  
MS-7942B

CROSSTALK  
JA-5962, MS-7954

CRYSTAL GROWTH  
JA-6062, JA-6086

CRYSTALLINE STRUCTURE  
JA-6078

CRYSTALLITES  
JA-6044

CURRENT DENSITIES  
JA-6014, JA-6035

CURRENT LEAKAGE  
JA-6079

CYLINDRICAL PIPE  
JA-6126

D/A CONVERTER  
MS-7683C

DARPA ROBUST DATABASE  
MS-7671

DEEP SPACE SURVEILLANCE  
JA-6105

DEMAND ASSIGNMENT MULTIPLE ACCESS  
JA-6111

DEMODULATOR  
MS-7629

DEMPSTER-SHAFER THEORY OF EVIDENCE  
MS-7641

DEPOSITION PROCESS  
JA-6134

- DESIGN PROPOSAL  
TR-810
- DETECTION  
MS-7584
- DETECTION ALGORITHM  
MS-7589
- DEVICE APPLICATIONS  
JA-6055
- DEVICE FABRICATION  
JA-6053, JA-6055, MS-7553
- DEVICE SPEED OR RESPONSE TIME  
MS-7393
- DIAGNOSTIC SYSTEM  
MS-7750B
- DIAMOND  
JA-6055, MS-7859
- DIAMOND AND SILICON  
PERMEABLE BASE TRANSISTOR  
MS-7859
- DIAMOND SUBSTRATES  
MS-7859
- DIELECTRICS  
JA-6044
- DIFFERENTIAL ABSORPTION LIDAR  
MS-7607
- DIFFRACTION  
JA-6200
- DIFFRACTIVE COUPLING  
JA-6073
- DIFFRACTIVE OPTICS  
MS-7768
- DIFFUSION  
JA-6035
- DIGITAL IMAGE PROCESSING  
MS-7554
- DIGITAL LOGIC  
MS-7563
- DIGITAL SYSTEMS  
MS-7634
- DIODE LASER TRANSMITTER  
MS-7913
- DIODE LASERS  
JA-6004, JA-6041, JA-6109, JA-6114,  
JA-6118, JA-6148, MS-7444, MS-7634,  
MS-7770, MS-7913
- DIODE MIXERS  
MS-8106
- DIODES  
MS-7838
- DIPOLE TAPE  
JA-6066
- DIRECT DETECTION  
MS-7640
- DIRECT DETECTION LASER TRANSCEIVER  
MS-7952
- DIRECTION FINDING  
JA-5893
- DISCRIMINANT CLUSTERING  
MS-7669
- DISCRIMINATION  
TR-789
- DISORDER-INDUCED COUPLING  
JA-6078
- DISPERSIVE DELAY LINE  
JA-5594, MS-7629
- DISPERSIVE FILTERS  
MS-7629
- DISPLACED PHASE CENTER ANTENNA  
MS-7417

## **Subject Index**

### **DISTORTION**

JA-6106

### **DISTRIBUTION**

TR-789

### **DOPING**

JA-6121, JA-6142

### **DOPPLER MEASUREMENTS**

MS-7513

### **DOPPLER RADAR**

JA-6120

### **DOPPLER SIGNATURES**

MS-7925

### **DOPPLER TIME IMAGES**

MS-7649

### **DOPPLER WEATHER RADAR**

MS-7554, MS-7588, MS-7716

### **DOUBLE BARRIER**

#### **HETEROSTRUCTURES**

MS-7563

### **DOUBLE BARRIER STRUCTURES**

JA-6076, JA-6102, MS-7584, MS-7838

### **DOUBLE HETEROSTRUCTURE**

JA-6064

### **DOUBLE SIDEBAND IR WAVEGUIDE MODULATOR**

MS-7880

### **DOWNBURST**

JA-6120

### **DRAIN-SOURCE BREAKDOWN**

#### **VOLTAGE**

JA-6031

### **DRIFT**

MS-7503

### **DRY ETCHING**

JA-6006, JA-6079, JA-6131, MS-7911

### **DRY ETCHING INDUCED DAMAGE**

JA-6153, MS-7815

### **DTW RECOGNIZERS**

MS-7669

### **DUAL POLARIZATION**

JA-6106

### **DUAL TANDEM SSB MODULATOR**

MS-7867

### **DYNAMIC RANDOM ACCESS MEMORY**

JA-6029

### **EARTH'S ATMOSPHERE**

MS-7606

### **EARTH'S SHADOW**

JA-6105

### **EHF TRANSMITTER**

MS-7754

### **EICHHORN TECHNIQUE**

JA-6094

### **ELECTRICAL PROBE**

JA-6072

### **ELECTRICAL PROPERTIES**

JA-5997

### **ELECTRICAL RESISTANCE**

JA-6008

### **ELECTROABSORPTION**

JA-6047, MS-7526

### **ELECTROMAGNETIC WAVE**

#### **PROPAGATION**

TR-807

### **ELECTROMAGNETIC WAVES**

TR-807

### **ELECTRON BEAM LITHOGRAPHY**

JA-6153, MS-7815

ELECTRON BEAM PUMPING

JA-6032

ELECTRON DEVICES

JA-6057

ELECTRON TRANSPORT

JA-6153, MS-7815

ELECTRONIC INTEGRATED  
CIRCUITS

JA-6027

ELECTRONIC MATERIALS

JA-6151, JA-6158

ELECTROOPTIC MODULATOR

JA-6091, MS-7655, MS-7853, MS-7867,  
MS-7957

ELECTROOPTIC SWITCHES

MS-7954

ELECTROOPTICAL SENSORS

JA-6105

ELECTROOPTICS

JA-6102

EMISSION CHARACTERISTICS

JA-6032

ENERGY MINIMIZING NEURAL  
NETWORKS

TR-805

EPITAXIAL DIAMOND FILMS

MS-7859

EPITAXIAL GROWTH

JA-6177

EPITAXY

JA-6055

EQUATIONS OF MOTION

JA-5937

EQUATORIAL PLANE

MS-7442

ERROR PERFORMANCE BOUNDS

MS-7924

ESTIMATION THEORY

JA-6077

ETCHING

JA-6127

EULER ANGLES

JA-5966

EXCIMER LASER

JA-6029, JA-6197, MS-7513, MS-7623

EXCIMER LASER ETCHING

JA-6197

EXCIMER PROJECTION SYSTEMS

MS-7623, MS-7623A

EXCITON ABSORPTION

JA-6069, MS-7843

EXHAUST PLUMES

JA-6072

EXPANDING HULL ALGORITHM

JA-5958

EXPERT SYSTEM

MS-7716

EXTREMELY HIGH FREQUENCY

JA-6111, MS-7425A

FAA

MS-7554

FABRICATION

JA-6084, MS-7582, MS-7660

FABRY-PEROT ETALON

MS-7880

FABRY-PEROT LASER

JA-6004

FALSE ALARM

TR-808

## **Subject Index**

FALSE DETECTION  
TR-808

FARADAY ISOLATOR  
JA-6191

FARADAY ROTATION  
JA-6191, MS-7752

FAR FIELD  
MS-7417

FAR FIELD PATTERN  
JA-6073

FAULT TOLERANCE  
TR-814

FEATURE EXTRACTION  
TR-797, MS-7681, MS-8109

FEEDBACK LOOP  
MS-7674

FEP (FLTSATCOM EHF PACKAGE)  
JA-6111, MS-7425A

FEP 7  
MS-7425A

FEP 8  
JA-6111

FEPOC (FEP OPERATIONS CENTER)  
MS-7425A

FERRIMAGNETIC DEVICES  
MS-7582

FERRIMAGNETISM  
JA-5975, MS-7586

FERRITES  
JA-5975

FIELD EFFECT TRANSISTORS  
TR-812, MS-7754

FILTER BANK  
MS-7585

FINITE DATA CORRELATION SEQUENCES  
JA-5958

FINITE LENGTH SEQUENCES  
JA-5958

FIREPOND  
TR-815

FLASHLAMP LASER  
MS-7758

FLIR (FORWARD LOOKING INFRARED)  
MS-7768

FLAWS RADAR  
JA-6120, MS-7588

FLTS  
JA-6111

FLTSATCOM  
MS-7425A

FLTSATCOM EHF PACKAGE (SEE FEP)

FLUOROCARBONS  
JA-6127

FOCAL PLANE ARRAY  
JA-6105

FOCAL PLANE PROCESSOR  
TR-814

FOCK'S SERIES  
JA-6200

FOCUSED ION BEAM  
JA-6074, JA-6121

FORCED CONVECTION  
TR-787

FORWARD-BACKWARD TRAINING  
ALGORITHM  
MS-7669

FORWARD LOOKING INFRARED  
(SEE FLIR)



FOUR WAVE MIXING

JA-6109, JA-6148

FOURIER TRANSFORM

JA-5893, MS-7629

FOWLER-NORDHEIM STRESSING

JA-6115

FRAME-TO-FRAME CORRELATION

TR-789

FREE CARRIER

JA-6191

FREE CARRIER SPIN

JA-6191

FREE ELECTRON LASERS

JA-6123

FREQUENCY DOMAIN

JA-5966

FREQUENCY MEASUREMENT

MS-7752, MS-7755

FREQUENCY RESPONSE

MS-7587

FREQUENCY SHIFT KEYING

MS-7629, MS-7750B

FREQUENCY SHIFTING

JA-5936, MS-7880

FREQUENCY STABILIZATION

MS-7325C

FREQUENCY STANDARDS

MS-7325B

GAIN GUIDED LASER DIODE ARRAY

JA-6004, MS-7790

GALLIUM ALUMINUM ARSENIDE

MS-7553

GALLIUM ALUMINUM ARSENIDE

LASERS

JA-5978, JA-6004, JA-6041, MS-7750B,  
MS-7913

GALLIUM ARSENIDE

JA-6006, JA-6030, JA-6035, JA-6047,  
JA-6053, JA-6056, JA-6064, JA-6069,  
JA-6075, JA-6102, JA-6114, JA-6121,  
JA-6134, JA-6153, JA-6163, MS-7526,  
MS-7553, MS-7581, MS-7584, MS-7815,  
MS-7838, MS-8106

GALLIUM ARSENIDE/ALUMINUM

GALLIUM ARSENIDE

JA-6037, JA-6151

GALLIUM ARSENIDE/ALUMINUM

GALLIUM ARSENIDE EPILAYERS

MS-7727

GALLIUM ARSENIDE/ALUMINUM

GALLIUM ARSENIDE LED

JA-6151

GALLIUM ARSENIDE DIODE

JA-6035

GALLIUM ARSENIDE LASERS

JA-6064

GALLIUM ARSENIDE MESFET

MS-7557, MS-7770

GALLIUM ARSENIDE P-I-N DIODE

JA-6035

GALLIUM ARSENIDE PERMEABLE BASE

TRANSISTOR

MS-7570, MS-7754

GALLIUM ARSENIDE SUBSTRATE

JA-6037, JA-6177

GALLIUM INDIUM ARSENIDE

PHOSPHIDE

JA-6008, MS-7444

## Subject Index

GALLIUM INDIUM ARSENIDE  
PHOSPHIDE/INDIUM PHOSPHIDE  
LASERS  
MS-7912

GALLIUM INDIUM PHOSPHIDE  
JA-6114

GAMMA RAYS  
JA-6024

GARNETS  
JA-5975

GATE DIELECTRICS  
JA-6016A, JA-6115

GATE OXIDES  
JA-6016A, JA-6090

GAUSSIAN NOISE  
TR-808

GAUSSIAN SIGNALS  
JA-5978

GEGENBAUER POLYNOMIALS  
TR-807

GIBBS MACHINE  
TR-805

GRAPHITE/EPOXY  
JA-6146, MS-7515

GRATINGS  
MS-7587

GROWTH CHARACTERISTICS  
MS-7727

GUIDED MISSILES  
JA-6011

GUIDED WAVE OPTICS  
JA-6075

GUIDED WAVE OPTOELECTRONICS  
JA-6075

GUNN DIODE  
JA-6121

H INFINITY  
MS-8147

HARMONIC MULTIPLIER  
MS-7563

HARMONIC RETRIEVAL  
JA-5981

HARMONIC SIGNAL  
JA-5981

HARMONIC TERMINATION  
TR-812

HEAT CONDUCTION  
JA-6126

HEAT DISSIPATION  
JA-6118

HEAT LOSSES  
JA-6126

HEAT SINK  
TR-787, JA-6118, MS-7869A

HEAT TRANSFER  
JA-6126

HELIUM NEON LASER  
JA-6041, JA-6162

HETEROBARRIER  
MS-7584

HETERODYNE  
JA-5978, MS-7913

HETERODYNE DETECTION  
MS-7640, MS-7889, MS-7913, MS-8048

HETERODYNE LASER CROSSLINK  
JA-6167

HETERODYNE RECEIVER  
MS-8106

HETEROEPITAXIAL LAYERS

JA-6064

HETEROEPITAXY

JA-6027

HIDDEN MARKOV MODEL

JA-5964, JA-6141, MS-7669, MS-7670

HIGH DENSITY INTERCONNECT

MS-7783

HIGH ELECTRON MOBILITY

TRANSISTOR

TR-812

HIGH ENERGY LASER MIRROR

JA-6118

HIGH ENERGY LASERS

JA-6118

HIGH FREQUENCY OSCILLATIONS

MS-7563

HIGH GAIN

JA-6040

HIGH POWER LASER

MS-8094

HIGH RESOLUTION

TR-819, MS-7587

HIGH SPEED DEVICES

MS-7838

HIGH SPEED OPTICAL INTERSATELLITE  
DATA LINKS

MS-7952

HIGH TEMPERATURE

JA-6065, MS-7586

HIGH TEMPERATURE RESEARCH

JA-6044

HIGH-POWER JUNCTION FET'S

JA-6155

HOLOGRAPHIC GRATING

MS-7582

HOMOEPITAXIAL SEMICONDUCTING  
DIAMONDS

MS-7859

HOPFIELD NETWORKS

TR-805

HORN ANTENNAS

MS-8106

HOT JET ETCHING

JA-6006

HOUGH TRANSFORM

TR-818, JA-5941, MS-7649

HUFNAGEL-VALLEY TURBULENCE  
MOMENTS

TR-807

HYBRID ADAPTIVE FEEDBACK

NULLING

MS-7674

HYBRID STRUCTURE

MS-7869A

HYDRAULIC SYSTEM

MS-7515

HYPOTHESIS TESTING

TR-808

IBAE DEFINED MASS TRANSPORTED  
BH LASERS

JA-6079

ICBM

TR-789

IMAGE MEASUREMENT

MS-7513

IMAGE PROCESSING

TR-797, TR-814, JA-5941, MS-7649,  
MS-8109

## Subject Index

- IMAGE RECONSTRUCTION  
MS-7930
- IMAGE SEGMENTATION  
MS-7681
- IMAGE UNDERSTANDING  
TR-818
- IMAGING OPTICS  
JA-6029
- IMAGING RADAR  
MS-7554
- IMPLANTS  
JA-6074
- IN SITU OPTICAL MICROSCOPY  
MS-7626
- IN SITU PROCESSING  
JA-6084, JA-6158, JA-6197
- INDEXED GUIDED ARRAY  
MS-7911
- INDIUM ANTIMONIDE  
JA-6191
- INDIUM GALLIUM ARSENIDE  
JA-6056, JA-6177, MS-7526, MS-7660
- INDIUM GALLIUM ARSENIDE/GALLIUM  
ARSENIDE  
MS-7843
- INDIUM GALLIUM ARSENIDE PHOSPHIDE  
JA-6079, JA-6131, MS-7717, MS-7911,  
MS-7912
- INDIUM GALLIUM ARSENIDE  
PHOSPHIDE/INDIUM PHOSPHIDE  
BURIED HETEROSTRUCTURE LASER  
JA-6079
- INDIUM PHOSPHIDE  
TR-787, JA-5997, JA-6008, JA-6075,  
JA-6079, JA-6089, JA-6114, JA-6118,  
JA-6131, MS-7444, MS-7660
- INDIUM PHOSPHIDE ALLOY  
MS-7717
- INDUCTORS  
JA-6134
- INFRARED ABSORPTION  
JA-6062, JA-6078
- INFRARED ANISOTROPY  
JA-6044, JA-6142
- INFRARED APPLICATIONS  
MS-7768
- INFRARED DETECTORS  
TR-814, JA-6060
- INFRARED LASERS  
JA-6041
- INFRARED OPTICAL SYSTEMS  
MS-7768
- INFRARED RADAR  
MS-7641
- INFRARED REFLECTIVITY  
JA-6044
- INFRARED SENSORS  
JA-6105, MS-7768
- INFRARED SPECTRUM  
MS-7325C
- INFRARED WAVEGUIDE MODULATORS  
MS-7880
- INJECTION BEHAVIOR  
JA-6004
- INJECTION LOCKING  
JA-6041
- INSERTION LOSS  
JA-6191

INTEGRAL EQUATIONS

JA-5869

INTEGRATED CIRCUITS

TR-787, JA-6029, JA-6064, JA-6116,  
JA-6134

INTEGRATED OPTIC DEVICES

JA-6075

INTEGRATED OPTICAL

INTERFEROMETERS

MS-7954, MS-7957

INTEGRATED OPTICAL SWITCHES

MS-7954

INTEGRATED OPTICS

JA-6052, JA-6163

INTERFACE STATUS

JA-6115

INTERFERENCE CANCELLATION

MS-7417

INTERFEROMETERS

JA-6052

INTERFEROMETRIC MODULATOR

JA-6106, MS-7503

INTERMODULATION

JA-6106

INTERSATELLITE CROSSLINK

JA-6167, MS-7942B

ION BEAM ASSISTED ETCHING

JA-6006, JA-6079, JA-6114, JA-6131,  
JA-6153, JA-6177, MS-7553, MS-7815

ION BEAM ETCHED

MS-7553, MS-7660

ION BEAMS

JA-6197

ION BOMBARDMENT

JA-6163

ION IMPLANTATION

JA-6074, JA-6155

ION VELOCITY

JA-6072

IONIZING RADIATION

JA-6016A, JA-6115

IRIDIUM SILICON SCHOTTKY-BARRIER

INFRARED DETECTORS

JA-6158

IRON-DOPED INDIUM PHOSPHIDE

JA-5997

IRON-DOPED LITHIUM NIOBATE

JA-5955

ISOLATED WORD RECOGNITION

JA-6141, MS-7667, MS-7669, MS-7670

ISOPLANATIC ANGLE

JA-6066

ISOPLANATISM

JA-6066

ISOTOPE LASERS

MS-7325B, MS-7325C

ITINERANT POLARONS

TR-802

JOINT AIRPORT WEATHER STUDIES

JA-6120

JOSEPHSON JUNCTION

JA-6014

KALMAN FILTER

JA-5966

KEPLER'S EQUATION

TR-796

KOHONEN ALGORITHM

MS-7683C, MS-7785

## **Subject Index**

### **LAGRANGE EQUATIONS**

TR-796

### **LANTHANUM BARIUM COPPER OXIDE**

JA-6083

### **LANTHANUM STRONTIUM COPPER OXIDE**

JA-6044, JA-6142

### **LARGE SIGNAL GAIN**

TR-812

### **LASER AMPLIFIERS**

JA-6040, JA-6159, MS-7666

### **LASER ANNEALING**

JA-6116

### **LASER ARRAY**

MS-7790

### **LASER BEAM ADDITION**

JA-6162

### **LASER BEAM CONTROL**

MS-7497A

### **LASER BEAMS**

TR-807, JA-6116, JA-6123, JA-6132

### **LASER CHEMICAL MODIFICATION**

JA-6065

### **LASER COMMUNICATION SYSTEM**

MS-7750B

### **LASER COMMUNICATIONS**

JA-6167, MS-7942B

### **LASER DIODES**

JA-5936, JA-6073

### **LASER DIRECT WRITING**

JA-6134, JA-6139, JA-6197, MS-7587

### **LASER ENGINEERING**

MS-7623A

### **LASER IMAGING**

JA-6088

### **LASER INDUCED DAMAGE THRESHOLD**

MS-8094

### **LASER INDUCED DIODE LINKING**

JA-6116

### **LASER INDUCED LINK**

JA-6116

### **LASER INTERSATELLITE**

TRANSMISSION EXPERIMENT

MS-7942B, MS-7952

### **LASER LIGHT**

JA-6162

### **LASER PATTERNING**

JA-6057

### **LASER PHOTOCHEMICAL**

TECHNIQUES

JA-6139

### **LASER PUMPING**

JA-6040

### **LASER RADAR**

JA-6038, JA-6088, MS-7444, MS-7513,  
MS-7515, MS-7853, MS-7867, MS-7880,  
MS-7886, MS-7925, MS-7930, MS-8048

### **LASER RADAR MEASUREMENTS**

MS-7853, MS-7867, MS-7880, MS-7886,  
MS-7889, MS-7925, MS-7930, MS-8048,  
MS-8094

### **LASER RADAR REFLECTIVE**

PROJECTION

MS-7930

### **LASER REMOTE SENSING**

MS-7606, MS-7640

### **LASER RESTRUCTURING**

JA-5941

LASER SOLID INTERACTION

JA-6132

LASER TRIMMING

JA-6139

LASERS

JA-6008, JA-6040, JA-6070, JA-6079,  
JA-6086, JA-6109, JA-6116, JA-6131,  
JA-6148, MS-7444, MS-7606, MS-7607,  
MS-7623A, MS-7634, MS-7640, MS-7660,  
MS-7912, MS-8048

LATTICE ELECTROSTATIC ENERGY

JA-5975

LEAKAGE

JA-6090

LEARNING ALGORITHMS

TR-813

LENSES

MS-7660

LENSLETS

JA-6089, MS-7912

LIDAR

MS-7606, MS-7607, MS-7640

LIGHT EMITTING DIODE

JA-6151

LIGHT PROPAGATION

TR-819

LIGHT SCATTERING

JA-6123

LIGHTWEIGHT MIRROR

JA-6146, MS-7515

LINCOLN STRESSED SPEECH

DATA BASE

MS-7669, MS-7670

LINEAR TRANSCONDUCTANCE

TR-812

LINEAR TRANSFORMATION

JA-6000

LIQUID COOLED

TR-787

LIQUID HELIUM

JA-6191

LIQUID HELIUM TEMPERATURE

JA-6191

LIQUID-SOLID INTERFACE

MS-7626

LITHIUM NIOBATE

JA-6106, JA-6139, MS-7503, MS-7582,  
MS-7954, MS-7957

LITHIUM NIOBATE PHASE

MODULATOR

MS-7673

LITHIUM TANTALATE

JA-6102

LITHIUM TITANIUM FERRITE

JA-5975

LITHOGRAPHY

JA-6029, JA-6084, MS-7444, MS-7623A

LOCAL OSCILLATOR

JA-5978

LONGITUDINAL MODES

JA-6078

LOW FLYING AIRCRAFT

JA-5893

LOW LEVEL WIND SHEAR ALERT  
SYSTEM

JA-6120, MS-7588

LOW NOISE

JA-6017, MS-7582

LOW PHASE NOISE OSCILLATOR

JA-5955, MS-7755

## **Subject Index**

### **LOW THRESHOLD**

JA-6064

### **LOWER BOUND**

JA-6126

### **LUMPED ELEMENT ELECTROOPTIC MODULATOR**

MS-7957

### **LWIR**

JA-6105, JA-6158

### **M-ARY**

MS-7629

### **MACH-ZEHNDER INTERFEROMETER**

JA-5978

### **MACH-ZEHNDER INTERFEROMETRIC MODULATOR**

MS-7957

### **MACHINE INTELLIGENCE**

TR-818, MS-7641, MS-7681

### **MACHINE LEARNING**

TR-805, TR-813

### **MAGNETIC EXCHANGE**

TR-802, JA-5975

### **MAGNETIC FIELDS**

JA-6191

### **MAGNETIC SUSCEPTIBILITY**

MS-7586

### **MAGNETOCRYSTALLINE ANISOTROPY**

JA-5975

### **MASKED ION BEAM LITHOGRAPHY**

JA-6006, JA-6053, JA-6153, MS-7553,  
MS-7815

### **MASS TRANSPORT**

JA-6008, JA-6089, JA-6131, MS-7634,

MS-7911, MS-7912

### **MASTER OSCILLATOR**

JA-6040

### **MASTER OSCILLATOR-POWER AMPLIFIER**

MS-8094

### **MATCHED FILTERS**

TR-814

### **MATCHING**

MS-7683C

### **MATHEMATICAL ESTIMATION**

JA-6077

### **MATHEMATICAL FORMULAS**

JA-5978

### **MATHEMATICAL MORPHOLOGY**

TR-797, MS-8109

### **MATHEMATICS**

JA-5869

### **MAXIMUM LIKELIHOOD TECHNIQUE**

TR-814

### **MEASUREMENT CORRELATION**

JA-5966, JA-5978

### **MEDIUM WAVELENGTH INFRARED**

JA-6105

### **MELLIN TRANSFORM**

TR-807

### **MESA**

JA-6079

### **MESFETS**

JA-6030, JA-6053, MS-7770

### **METALLIC OXIDE VAPOR PHASED EPITAXY GROWTH**

MS-7717



- METALORGANIC CHEMICAL  
VAPOR DEPOSITION  
JA-6177
- METAL OXIDES  
JA-6057, JA-6065
- METEOROLOGICAL CONDITIONS  
MS-7554, MS-7588
- METEOROLOGICAL RADAR  
MS-7716
- MICROBURSTS  
JA-6120, MS-7554, MS-7588, MS-7716
- MICROCHANNEL HEAT SINKS  
TR-787, JA-6118
- MICROELECTRONICS  
TR-787, JA-6029, JA-6084, JA-6118,  
JA-6153, MS-7815
- MICROHEX (COMPUTER PROGRAM)  
TR-787
- MICROLENS  
JA-6073, MS-7444
- MICROLITHOGRAPHY  
MS-7623A
- MICROSTRIP CIRCUIT ELEMENT  
MS-7766
- MICROWAVE CIRCUIT  
MS-7770
- MICROWAVE COMPONENTS  
JA-6134
- MICROWAVE DEVICES  
JA-6026A, JA-6134
- MICROWAVE FREQUENCY  
MS-7754
- MICROWAVE POWER AMPLIFIER  
TR-812
- MICROWAVE RESONATORS  
JA-5955
- MICROWAVE SWITCHES  
JA-6035
- MICROWAVE TECHNOLOGY  
MS-7766
- MILITARY COMMUNICATIONS  
MS-7425A, MS-7942B
- MILLIMETER WAVE FREQUENCY  
MS-7754
- MILLIMETER WAVE OSCILLATIONS  
MS-7563
- MILLIMETER WAVELENGTH  
MS-7752
- MILSATCOM  
MS-7425A
- MINIATURE LENSES  
MS-7660
- MINIMUM LENGTH CORRELATION  
EXTENSION  
JA-5958
- MINIMUM MEAN-SQUARED ERROR  
ESTIMATION  
TR-794
- MINIMUM VARIANCE REDUCED  
ORDER  
JA-6000
- MINIMUM-ORDER MOVING-AVERAGE  
MODELING  
JA-5958
- MIRRORS  
JA-6131, JA-6146, MS-7660
- MISS DISTANCE  
JA-6011

## Subject Index

### MNOS

MS-7783

### MOBILE COMMUNICATIONS

JA-5849

### MOBILITY

JA-6035

### MODE COUPLING

JA-6078

### MODE MATCHING EFFICIENCY

JA-5978

### MODE PURITY

MS-7853

### MODEL PARAMETERS

MS-7670

### MODULATION

JA-6035

### MODULATORS

JA-6091

### MOLECULAR BEAM EPITAXY

JA-6030, JA-6037, JA-6056, JA-6076,  
JA-6155, JA-6177, MS-7526, MS-7557,  
MS-7584

### MOLECULAR FIELD COEFFICIENTS

MS-7586

### MOLYBDENUM

JA-6139

### MONOLITHIC GALLIUM ARSENIDE/ SILICON

JA-6027, JA-6064, JA-6151, MS-7770

### MONOLITHIC GALLIUM ARSENIDE/ SILICON DIODE LASERS

JA-6064

### MONOLITHIC INTEGRATION

JA-6151, MS-7393

### MONOLITHIC MICROWAVE INTEGRATED CIRCUIT

JA-6134, MS-7770

### MONOLITHIC TWO-DIMENSIONAL ARRAYS

MS-7444, MS-7553, MS-7912

### MONTE CARLO

TR-808

### MORPHOLOGY

MS-7626

### MOS

JA-6015, JA-6016A, MS-7783

### MOS DEVICES

JA-6115

### MOSFETS

JA-6015, JA-6090, JA-6151

### MOTION

MS-7442

### MOTION ANALYSIS

JA-5937

### MULTICRYSTAL CONFIGURATIONS

MS-7867

### MULTIDIMENSIONAL CORRELATION SEQUENCES

JA-5958

### MULTIDIMENSIONAL SIGNAL DETECTION

MS-7663

### MULTIFRAME INTERPOLATION

TR-794

### MULTILAYER PERCEPTRON

TR-813, JA-6141, MS-7785

### MULTILAYER PERCEPTRON NEURAL NETWORK

TR-813

### MULTIPATH

JA-5849

MULTIPLE COMPLEX PLANES

TR-807

MULTIPLE QUANTUM WELLS

JA-6047, JA-6056, JA-6109, JA-6148,  
JA-6163, MS-7526, MS-7581, MS-7843

MULTIPLE TARGETS

MS-7515

MULTIPOINT

JA-6124, MS-7766

MULTIPROCESSOR

JA-6140

MULTISECTION MODULATOR

MS-7867

MULTISTRIP COUPLERS

JA-5594

N-CHANNEL

JA-6031

NATURAL RADIATION ENVIRONMENT

JA-6017

NEAR FIELD

MS-7417

NEGATIVE DIFFERENTIAL  
RESISTANCE

JA-6026A, MS-7584

NEOCOGNITRON

JA-6048

NEODYMIUM:YTTRIUM ALUMINUM  
GARNET LASERS

JA-6041, JA-6088, JA-6159, MS-7606,  
MS-7666

NEURAL NETWORK LEARNING  
ALGORITHMS

TR-813

NEURAL NETWORKS

TR-805, TR-808, TR-810, TR-813,  
JA-6048, JA-6141, MS-7667, MS-7668,  
MS-7683C, MS-7783, MS-7785

NEUROMORPHIC SYSTEMS

MS-7783

NEXT GENERATION WEATHER

RADAR

MS-7588

NEYMAN-PEARSON

TR-808

NEYMAN'S TEST

TR-803

NICKEL

MS-7553

NICKEL/GERMANIUM/GOLD  
LAYERS

MS-7584

NIMROD

JA-6120

NIOBIUM

MS-7491A

NITRIDED OXIDE

JA-6115

NMOS

MS-7770

NOISE

JA-6011

NOISE LEVEL

MS-8048

NOISE REDUCTION

MS-8106

NOISE REMOVAL

MS-8109

## Subject Index

- NONLINEAR ADAPTIVE PREPROCESSOR  
MS-7681
- NONLINEAR CAD  
TR-812
- NONLINEARITY  
MS-7503
- NULLING SYSTEMS  
MS-7674
- OBJECT RECOGNITION  
TR-817, TR-818, MS-7641
- OBLATE BODY  
MS-7442
- OHMIC CONTACTS  
MS-7584
- ONE-DIMENSIONAL RADIAL FLOW  
JA-6126
- OPTICAL AMPLIFICATION  
JA-6109
- OPTICAL AUTODYNE TECHNIQUES  
MS-7925
- OPTICAL BEAMS  
MS-7752
- OPTICAL CIRCUITS  
MS-7503, MS-7954, MS-7957
- OPTICAL COMMUNICATION  
MS-7913
- OPTICAL COMPUTING  
JA-6056, MS-7581
- OPTICAL DATA ANALYSIS  
TR-819
- OPTICAL DESIGN  
MS-7623
- OPTICAL DETECTION  
MS-7663
- OPTICAL DISCRIMINATION  
TR-789, JA-6146
- OPTICAL FIBER COMMUNICATIONS  
JA-6106, MS-7634
- OPTICAL FREQUENCIES  
JA-5936
- OPTICAL HETERODYNE  
JA-5978
- OPTICAL HETERODYNE  
COMMUNICATIONS SYSTEMS  
JA-6167, MS-7750A, MS-7942B
- OPTICAL INJECTION LOCKING  
JA-6041
- OPTICAL INTEGRATED CIRCUITS  
JA-6075
- OPTICAL INTERCONNECTS  
JA-6027
- OPTICAL KERR EFFECT  
JA-6123
- OPTICAL LINKS  
MS-7957
- OPTICAL MATERIALS  
MS-7623, MS-7623A, MS-8094
- OPTICAL MODULATORS  
JA-6106
- OPTICAL PROPERTIES  
JA-6142
- OPTICAL PUMPING  
JA-6069
- OPTICAL SIGNAL PROCESSING  
JA-6047, JA-6056, MS-7526, MS-7581
- OPTICAL SPACE SURVEILLANCE  
TR-819
- OPTICAL TECHNIQUES  
JA-6029, MS-7582

- OPTICAL TRANSMISSION  
JA-6163
- OPTICAL WAVEFRONT MEASUREMENT  
JA-6052
- OPTIMAL CONTROL  
JA-6000
- OPTIMAL H INFINITY DISTURBANCE  
ATTENUATION PROBLEM  
MS-8147
- OPTIMAL POLARIMETRIC DETECTOR  
MS-7589
- OPTOELECTRONIC INTEGRATION  
JA-6027
- OPTOELECTRONIC SWITCH  
MS-7393
- OPTOMECHANICAL SUBSYSTEM  
MS-7952
- ORBIT DETERMINATION  
TR-796, JA-6199
- ORGANOMETALLIC CHEMICAL  
VAPOR DEPOSITION  
MS-7570
- ORGANOMETALLIC VAPOR  
PHASE EPITAXY  
JA-6064, JA-6163, MS-7727
- OSCILLATIONS  
JA-6076
- OSCILLATORS  
JA-6076, MS-7325C, MS-7838
- P-I-N DIODES  
JA-6035, JA-6069
- P-SUBSTRATE  
JA-6008
- P-TYPE SUBSTRATE LASERS  
MS-7634
- PACKET NETWORKS  
JA-5849
- PACKET RADIO  
JA-5849
- PARALLEL COMPUTER ARCHITECTURE  
JA-6140
- PARAMETERIZATION  
MS-7649
- PATTERN ANALYSIS  
JA-5941
- PATTERN CLASSIFICATION  
JA-6048, MS-7785
- PATTERN RECOGNITION  
JA-6048
- PATTERN TRANSFER  
JA-6006
- PEAK RMS RATIO  
MS-7369, MS-7653
- PERCEPTRONS  
TR-808, JA-6141
- PERCEPTUAL REASONING  
TR-817
- PERFORMANCE ANALYSIS  
JA-6038, MS-7758
- PERIODICITY BASE GRATING  
MS-7754
- PERMEABLE BASE TRANSISTOR  
TR-812, MS-7754, MS-7755, MS-7859
- PEROVSKITES  
JA-6044
- PERTURBATION THEORY  
TR-796, MS-7442
- PHASE COMPENSATION  
MS-7497A

## Subject Index

PHASE CORRECTIONS  
MS-7587

PHASE DISPERSION  
MS-7653

PHASE INVARIANCE  
JA-6024

PHASE MODULATION  
MS-8048

PHASE NOISE  
MS-7582

PHASE RETRIEVAL  
TR-819

PHASE TRANSFORM  
JA-6065

PHASED ARRAY RADAR  
MS-7417

PHOSPHOSILICATE GLASS  
MS-7553

PHOTOCONDUCTIVITY  
MS-7393

PHOTODETECTORS  
JA-6035

PHOTOGRAPHIC ASTROMETRY  
JA-6094

PHOTOLITHOGRAPHY  
JA-5594, JA-6089, MS-7623

PHOTOREFRACTIVE EFFECTS  
MS-7503

PHOTORESIST  
JA-6029, JA-6127

PHOTOVOLTAIC EFFECT  
MS-7503

PICOSECOND  
MS-7393

PICOSECOND SWITCHING TIME  
JA-6102

PIEZOELECTRICS  
JA-5594

PISARENKO SCHEME  
JA-5981

PITCH ESTIMATOR  
TR-794

PITCH TRACKING  
TR-794

PIXELS  
MS-7843

PLANAR CIRCUIT ELEMENTS  
MS-7766

PLANAR MICROSTRIP CIRCUITS  
JA-6124

PLANAR VIAS  
JA-6074

PLASMA EFFECTS  
JA-6127

PLASMA ETCHING  
JA-6127

PLATE OVERLAP  
JA-6094

PLATINUM-ALUMINUM INDIUM  
ARSENIDE/INDIUM PHOSPHIDE  
JUNCTION FET'S  
JA-6155

PLATINUM IRIIDIUM SILICIDE  
JA-6060

PLATINUM SILICIDE  
JA-6158

PLATINUM SILICIDE DETECTORS  
JA-6158

PLATINUM SILICON FILM

MS-7755

POINT MASS

MS-7442

POLARIMETRIC MATCHED FILTER

MS-7589

POLARIMETRIC MEASUREMENTS

MS-7589

POLARIMETRIC RADAR

MS-7589

POLARIZATION

JA-6069

POLARON ACTIVATION ENERGY

TR-802

POLARON ENERGY

TR-802

POLYCRYSTALLINE

JA-6142

POLYGON APPROXIMATION

MS-7681

POLYMETHYLMETHACRYLATE

MS-7553

POWER AMPLIFIERS

TR-812, JA-6040

POWER COMBINING

MS-7766

POWER DIVIDERS

MS-7766

POWER EFFICIENCY

MS-7570

POWER SERIES FIELDS

MS-7442

POWER TRANSFER

JA-5962

PRECISION ORBIT DETERMINATION

JA-6199

PRECURSOR SIGNATURE

MS-7716

PROJECTIONS

MS-7663, MS-7925

PROTON BOMBARDMENT

JA-5997

PROTOTYPES

MS-7758

PSEUDOINVERSE ALGORITHM

JA-6000

PULSE REPETITION FREQUENCY EFFECT

MS-8094

PULSE-TO-PULSE STABILITY

MS-7623, MS-7623A

PULSE-TO-PULSE TIMING JITTER

MS-7886

PULSE WIDTH

MS-8094

PULSED DOPPLER RADAR

MS-7588

PULSED LASERS

JA-6038

PUMP LASER

JA-6040

PUMPED DYE LASER

MS-7758

PYROTECHNICAL PLASMA

JA-6072

PYROTECHNICS

A-6072

## Subject Index

- Q-BRANCHING  
JA-6061
- Q-SWITCH  
MS-7666
- Q-SWITCHED LASER  
MS-7606, MS-7607
- QUAD TRACKER  
TR-815
- QUADRATIC PHASE DISPERSION  
MS-7369
- QUADRATURE MIRROR FILTERS  
MS-7585
- QUADRATURE MIRRORS  
MS-7585
- QUANTUM EFFICIENCY  
JA-6060, JA-6079
- QUANTUM ELECTRONICS  
JA-6153, MS-7815
- QUANTUM-WELL CHARGE-  
COUPLED DEVICE  
MS-7581
- QUANTUM-WELL DOUBLE-  
HETEROSTRUCTURE LASERS  
MS-7553
- QUANTUM WELLS  
JA-6037, JA-6047, JA-6069, MS-7526,  
MS-7581, MS-7838
- QUARTER-MICRON GATE  
MS-7557
- QUASI OPTICAL FERRITE ROTATOR  
MS-7752
- RABI OSCILLATION  
JA-6061
- RADAR CROSS SECTIONS  
JA-6011
- RADAR IMAGES  
MS-7681
- RADAR IMAGING  
MS-7649
- RADAR MEASUREMENTS  
JA-5966
- RADAR OBJECT MODELING  
ENVIRONMENT  
TR-818
- RADAR PROPAGATION  
JA-6200
- RADAR SIGNAL DESIGN  
MS-7653
- RADAR SIGNAL PROCESSORS  
TR-818
- RADIAL SHEAR INTERFEROMETER  
JA-6157
- RADIATION EFFECTS  
JA-6016A, JA-6017
- RADIATION PATTERNS  
JA-6019, MS-7417
- RADIATION SOURCE  
JA-6024
- RADIO FREQUENCY  
MS-7557
- RAM REGISTERS  
MS-7683C
- RAMAN SCATTERING  
MS-7497A
- RAMAN SPECTROSCOPY  
JA-6061
- RANDOM AND SYSTEMATIC ERRORS  
MS-7886
- RANDOM CORRELATION MATRIX  
TR-803



**RANDOM EIGENVALUES**

TR-803

**RANDOM GRAM MATRIX**

TR-803

**RANDOM SPECTRUM**

TR-803

**RANGE DOPPLER IMAGERY**TR-797, TR-818, JA-6088, MS-7681,  
MS-7886, MS-7889, MS-8109**RANGE MEASUREMENTS**

MS-7513

**RAPID THERMAL ANNEALING**

JA-6116

**RARE EARTH MAGNETIC GARNETS**

MS-7586

**REACTIVE ION ETCHING**JA-6006, JA-6057, JA-6127, JA-6153,  
MS-7815**REACTOR DESIGN**

MS-7717

**REAL-TIME FIXED-POINT****IMPLEMENTATION**

MS-7672

**RECRYSTALLIZATION**

MS-7626

**RE-ENTRY VEHICLES**

JA-5937

**REFLECTANCE SPECTRA**

JA-6142

**REFLECTED HIGH ENERGY****ELECTRON DIFFRACTION**

MS-7557

**REFLECTION GRATINGS**

JA-5955, MS-7582

**REFLECTIVE ARRAY COMPRESSOR**

JA-6139, MS-7587

**REFLECTIVITY**

JA-6088, JA-6132

**REMOTE SENSING**

MS-7606, MS-7607, MS-7640

**REOXIDIZED NITRIDED OXIDES**

JA-6016A

**RESIDUAL ABSORPTION**

JA-6062

**RESISTANCE**

JA-6015

**RESISTIVITY**

JA-5997

**RESISTS**

MS-7623A

**RESONANCE**

TR-796

**RESONANT TUNNELING**JA-6026A, JA-6102, JA-6104, MS-7563,  
MS-7584, MS-7838**RESONANT TUNNELING DIODE**

JA-6076, JA-6102

**RESONATORS**

JA-5594, JA-5955, MS-7582

**RESTRUCTURABLE VLSI**

JA-5941

**REVERSIBLE TRIMMING TECHNIQUE**

JA-6134

**RF MODULATOR**

MS-7957

**RICCATI EQUATION**

MS-8147

**RIDGE-WAVEGUIDE LASERS**

JA-6064

## Subject Index

RIGID BODY MOTION ESTIMATION  
JA-5966

RING LASER  
JA-6041, JA-6070, MS-7673

ROBUST CONTROL DESIGN  
MS-8147

ROBUST SPEECH RECOGNITION  
JA-5964

ROCKET MOTORS  
JA-6072

RYTOV APPROXIMATION  
TR-807

SAMPLE MATRIX INVERSION  
JA-6019

SAPPHIRE  
JA-6086

SATELLITE COMMUNICATION  
SYSTEM  
MS-7750B

SATELLITE COMMUNICATIONS  
JA-6111, MS-7425A, MS-7629

SATELLITE DETECTION  
MS-7663

SATELLITE ORBITS  
TR-796, JA-6199

SATELLITE TRACKING  
JA-6199

SATURATION  
JA-6061

SAWTOOTH DRIVE CIRCUIT  
JA-5936

SCANNING ELECTRON MICROSCOPE  
MS-7623

SCATTERING  
JA-6026A

SCENE ANALYSIS  
TR-817

SCENE UNDERSTANDING  
TR-817

SCHOTTKY BARRIER INFRARED DETECTORS  
JA-6158

SCHOTTKY BARRIERS  
JA-6060, JA-6105, MS-7563, MS-8106

SCHOTTKY DIODE  
JA-6060, MS-8106

SEGMENTED CRYSTALS  
MS-7853

SEGMENTED MIRROR CONTROL  
JA-6157

SEKE (COMPUTER PROGRAM)  
JA-6200

SELECTIVE GROWTH METHOD  
JA-6155

SELF-ORGANIZING  
JA-6048, MS-7683C

SEMICONDUCTING DIAMOND  
MS-7859

SEMICONDUCTING DIAMOND FILMS  
MS-7859

SEMICONDUCTOR DEVICES  
JA-6075, JA-6084

SEMICONDUCTOR DIODE LASERS  
MS-7790

SEMICONDUCTOR EPILAYERS  
MS-7727

SEMICONDUCTOR INTEGRATED  
OPTIC DEVICES  
JA-6075

SEMICONDUCTOR LASERS

JA-5978, JA-6032, JA-6073, JA-6089,  
MS-7444, MS-7912

SEMICONDUCTOR MATERIALS

JA-6116

SEMICONDUCTOR PATTERNING

JA-6197

SEMICONDUCTOR PROCESSING

JA-6191, JA-6197

SEMICONDUCTORS

JA-6055

SEMI-INSULATION

JA-5997

SENSOR PERFORMANCE

JA-6052

SENSORS

JA-6146

SERIES RESISTANCE

JA-6015

SERRODYNE FREQUENCY SHIFTER

JA-5936

SERVO SYSTEM

MS-7515

SHORT-TIME FOURIER TRANSFORM

JA-6181

SIDEBAND SUPPRESSION

JA-5936

SIDELobe CANCELER

MS-7674

SIDEWALL GROWTH

JA-6177

SIGNAL GAIN

JA-6040, MS-7666

SIGNAL PLUS NOISE

MS-7663

SIGNAL PROCESSING

JA-5849, JA-5893, JA-6109

SIGNAL PROCESSOR

JA-5594

SIGNAL-TO-NOISE RATIO

MS-7640, MS-7889, MS-7925

SIGNATURES

MS-7649

SILHOUETTE IMAGING

MS-7641

SILHOUETTE RECOGNITION

TR-817

SILICA

JA-6078

SILICIDE ELECTRODES

JA-6060

SILICON

JA-6064, JA-6102, JA-6132, MS-7869A

SILICON DIODES

JA-6035

SILICON DIOXIDE

JA-6016A, JA-6127

SILICON DRIVER CIRCUIT

JA-6151

SILICON FILMS

MS-7626

SILICON GALLIUM ARSENIDE

SUBSTRATE

MS-7557

SILICON INTEGRATED CIRCUITS

TR-787

SILICON MOSFETS

JA-6031

SILICON NITRIDE

JA-6006, JA-6074

## **Subject Index**

SILICON-ON-INSULATOR  
JA-6031, JA-6090, JA-6116, MS-7626

SILICON PERMEABLE BASE  
TRANSISTORS  
MS-7755

SILICON P-I-N DETECTORS  
JA-5978

SILICON SUBSTRATES  
JA-6006, JA-6060, JA-6114, MS-7770

SIMPLE PENDULUM  
TR-796

SIMULATED STRESS  
JA-5964

SIMULATED SYSTEM  
MS-7674

SINEWAVE  
MS-7653

SINGLE FREQUENCY  
JA-6070, MS-7673

SINGLE INSTRUCTION STREAM-  
MULTIPLE DATA STREAM  
JA-6140

SINGLE LAYER PERCEPTRONS  
MS-7785

SINGLE SIDEBAND  
MS-7655, MS-7853, MS-7867

SINGLE SIDEBAND ELECTRO-  
OPTIC MODULATOR  
MS-7853, MS-7867

SINUSOIDAL ANALYSIS-SYNTHESIS  
TR-794, MS-7648, MS-7653, MS-7672

SINUSOIDAL MODEL  
JA-6181, MS-7648

SINUSOIDAL TRANSFORM CODING  
TR-794, MS-7672

SINUSOIDS  
JA-5981

SLAB WAVEGUIDES  
JA-5962

SMALL SIGNAL CHARACTERISTICS  
MS-7570, MS-7666, MS-7754

SODIUM RESONANCE RADIATION  
MS-7606

SOFTWARE  
JA-6140

SOLID STATE LASERS  
JA-6159, MS-7666, MS-7673

SOLID STATE TECHNOLOGY  
JA-6057

SPACE BASED COMMUNICATIONS  
MS-7913, MS-7952

SPACE BASED HETERODYNE  
COMMUNICATIONS  
MS-7913

SPACE BASED PLATFORM  
MS-7913

SPACE COMMUNICATIONS  
MS-7750B, MS-7952

SPACE SURVEILLANCE  
TR-819, JA-6105

SPACEBORNE LASER RADAR  
JA-6146

SPACECRAFT  
JA-6072

SPACING  
TR-803

SPATIAL ACQUISITION  
MS-7952

SPATIAL DISTRIBUTION  
JA-6037

SPATIAL LIGHT MODULATION  
JA-6047, JA-6056, MS-7526, MS-7581,  
MS-7843

SPATIAL MODE MATCHING  
JA-5978

SPATIAL RESOLUTION  
MS-7513

SPEAKER STRESS RESISTANCE  
MS-7671

SPECTRAL ANALYSIS  
JA-5981

SPECTRAL PURITY  
MS-7325B, MS-7325C, MS-7853

SPECTRAL SHIFT  
JA-6069

SPECTROSCOPY  
JA-6061, MS-7655

SPEECH  
MS-7369, MS-7648

SPEECH DATABASE  
JA-5964

SPEECH ENHANCEMENT  
TR-794

SPEECH EVALUATION  
MS-7369

SPEECH PROCESSING  
TR-794, JA-6181

SPEECH RECOGNITION  
JA-6141, MS-7668, MS-7670, MS-7785

SPEECH VARIATION  
MS-7670

SPEECH WAVEFORM  
MS-7369, MS-7653

SPHERICAL EARTH  
JA-6200

SPINEL FERRITES  
MS-7586

SPINELS  
JA-5975

SPUTTER ETCHING  
JA-5594

SS-X-16  
MS-7667

STABILITY  
JA-5966

STABILIZATION  
MS-7325B

STABLE LOCAL OSCILLATOR  
MS-7582

STAGGERED-TUNED-STAGGERED-PHASED  
SYSTEM  
MS-7867

STAR POSITIONS  
JA-6094

STARK EFFECT  
JA-6061

STARS  
JA-6066

STATISTICAL ESTIMATION  
JA-6077, JA-6094

STATISTICAL MECHANICS  
JA-6077

STATISTICAL OPTICS  
TR-819

STELLAR SCINTILLATION  
TECHNIQUE  
JA-6066

STENCIL MASK  
JA-6006

## **Subject Index**

STIMULATED LIGHT BY LIGHT  
SCATTERING  
JA-6123

STIMULATED RAMAN SCATTERING  
JA-6123

STOCHASTIC PROCESSES  
TR-808

STOKES WAVES  
MS-7497A

STORMS  
MS-7588

STRATEGIC DEFENSE INITIATIVE  
TR-789, MS-7513

STRIP LASERS  
JA-6079

STRONTIUM  
JA-6142

SUBMICROMETER PROCESSING  
JA-6006

SUBMICROMETER STRUCTURES  
JA-6053

SUBMILLIMETER WAVES  
MS-8106

SUBSTRATES  
JA-6031

SUMMATION PROJECTION  
MS-7663

SUMMED VOCALIC SPEECH  
WAVEFORMS  
TR-794

SUPERCONDUCTING ANALOG TRACK-  
AND-HOLD CIRCUIT  
JA-6014

SUPERCONDUCTING THIN FILMS  
JA-6057, JA-6083

SUPERCONDUCTIVE ANALOG SIGNAL  
PROCESSING DEVICES  
MS-7491A

SUPERCONDUCTIVE TUNNEL JUNCTION  
MS-7491A

SUPERCONDUCTIVITY IN OXIDES  
TR-802

SUPERCONDUCTORS  
JA-6057, JA-6065, JA-6083

SURFACE ACOUSTIC WAVE CONVOLVER  
JA-5594

SURFACE ACOUSTIC WAVE DEVICES  
JA-5594, JA-6139

SURFACE EMITTING DIODE LASER  
JA-6114, MS-7444, MS-7869A

SURFACE RESISTIVITY  
JA-6083

SURFACE-WAVE RESONATORS  
JA-5594

SWITCHBOARD IN THE SKY  
JA-6111

SYNCHRONOUS PROCESSOR  
JA-6140

SYNCHRONOUS PROCESSOR  
LANGUAGE  
JA-6140

SYNTHETIC SPEECH  
MS-7672

TALKER STRESS COMPENSATION  
JA-5964

TARGET CLASSIFICATION  
MS-7589

TARGET DETECTION  
MS-7589

- TARGET MODELING  
MS-7589
- TE-TM MODE  
JA-6106
- TECHNOLOGY DEVELOPMENT  
JA-6084
- TELESCOPES  
MS-7952
- TERMINAL DOPPLER WEATHER  
RADAR  
JA-6120, MS-7554
- TESSERAL HARMONICS  
TR-796
- THERMAL BLOOMING  
JA-6123
- THERMAL RESISTANCE  
TR-787, JA-6008, JA-6118
- THERMOMAGNETIZATION CURVES  
MS-7586
- THERMOSPHERIC PROPERTIES  
JA-6199
- THIN FILMS  
JA-6065, JA-6083, JA-6127
- THREE-DIMENSIONAL OBJECTS  
TR-817
- THUNDERSTORMS  
JA-6120
- TILT ANISOPLANATISM  
TR-815, JA-6066
- TIME CONCENTRATOR  
MS-7667
- TIME DELAY INTEGRATION  
TR-814
- TIME DEPENDENCE  
JA-6159
- TIME DIVISION MULTIPLE ACCESS  
JA-6111
- TIME DOMAIN TECHNIQUES  
JA-5893
- TITANIUM  
JA-6062
- TITANIUM:ALUMINUM OXIDE  
JA-6040, JA-6070, JA-6086, MS-7666,  
MS-7673
- TITANIUM:ALUMINUM OXIDE AMPLIFIER  
JA-6159
- TITANIUM:ALUMINUM OXIDE LASER  
JA-6159, MS-7673
- TITANIUM:LITHIUM NIOBATE  
JA-5936, JA-6106
- TOMOGRAPHIC IMAGE  
RECONSTRUCTION  
MS-7930
- TOMOGRAPHIC TECHNIQUES  
JA-6088
- TOMOGRAPHY  
JA-6088, MS-7930
- TRACK-AND-HOLD CIRCUIT  
JA-6014
- TRAINING TECHNIQUES  
MS-7669
- TRANSISTORS  
JA-6026A, MS-7563
- TRANSITION DETECTION  
TR-808
- TRANSITION METAL OXIDE  
SUPERCONDUCTIVITY  
TR-802
- TRANSITION METALS  
TR-802

## Subject Index

### TRANSMISSION/REFLECTION

FILTER

MS-7880

### TRANSPORT PROPERTIES

MS-7584

### TRANSVERSE MODES

JA-6078

### TUNABLE LASER

MS-7606, MS-7655, MS-7666, MS-7673,  
MS-8048

### TUNABLE OSCILLATOR

JA-6121

### TUNGSTEN

JA-6134

### TUNGSTEN GRATING

MS-7570

### TUNNEL DIODES

MS-7838

### TURBULENCE

TR-807

### TWO-DIMENSIONAL

JA-6032, JA-6114

### TWO-DIMENSIONAL PLANAR CIRCUIT

APPROACH

JA-6124

### TWO-DIMENSIONAL SURFACE-EMITTING

DIODE LASER ARRAYS

MS-7869A

### ULTRASONICS

MS-7924

### ULTRAVIOLET LASER RADAR

MS-7513

### ULTRAVIOLET OPTICAL MATERIALS

MS-7623

### UNARY ENCODING

MS-7683C

### UPLINK

MS-7629

### UPPER BOUNDS

JA-6126

### VALUE PROJECTION

MS-7663

### VAPOR PHASE EPITAXY

MS-7843

### VERTICAL GRADIENT FREEZE

JA-6086

### VERTICAL ROTATING-DISK REACTOR

MS-7727

### VIIAS

JA-6074

### VIBRATION TESTING

JA-6078

### VIBRATIONAL SPECTROSCOPY

JA-6061

### VITERBI NET

JA-6141

### VLSI

TR-814, JA-5594, JA-5941, JA-6064,  
JA-6141, JA-6197

### VLSI FABRICATION

JA-5594

### VOCALIC SPEECH SEGMENTS

MS-7648

### VOLTAGE CONTROLLED

OSCILLATOR

MS-7755



**WAFER FABRICATION**

JA-5941

**WAFER-SCALE ARCHITECTURE**

TR-814

**WAFER-SCALE INTEGRATION**

TR-814, JA-6116

**WAFER-SCALE TECHNOLOGY**

TR-814

**WAVEFORM GENERATION**

AND PROCESSING

MS-7886

**WAVEFORMS**

MS-7889

**WAVEFORMS AND RECEIVER DESIGN**

MS-7889

**WAVEGUIDE COUPLERS**

JA-5962

**WAVEGUIDE LASERS**

JA-6038

**WAVELENGTHS**

MS-7623

**WEATHER RADAR STUDIES**

MS-7554

**WEATHER RADARS**

MS-7716

**WEATHER STUDIES**

MS-7588

**WHITE LIGHT FRINGES**

JA-6157

**WHITE LIGHT INTERFEROMETER**

JA-6157

**WIDEBAND ANALOG SIGNAL  
PROCESSING**

MS-7491A

**WIDEBAND CORRELATION**

MS-7491A

**WIDEBAND IMAGING**

MS-8048

**WIDEBAND NULLING**

MS-7585

**WIDEBAND PACKET NETWORK**

JA-5849

**WIND SHEAR**

JA-6120, MS-7554, MS-7588, MS-7716

**WORD MODEL PARAMETERS**

MS-7670

**WORST CASE ANALYSIS**

MS-8147

**Y-BRANCHES**

MS-7954

**Y-JUNCTIONS**

MS-7911

**YTTRIUM BARIUM COPPER OXIDE**

JA-6083

**ZIRCONIUM**

JA-6072

**ZONE MELTING**

MS-7626

**ZONE-MELTING RECRYSTALLIZATION**

JA-6090

**2-D ARRAY**

JA-6073

**2-D IMAGING**

JA-6088

**3-D IMAGE**

MS-8109

## **Subject Index**

### **3-D OBJECTS**

**MS-7681**

### **4-JUNCTION-LOGIC BASED DIGITAL ADDRESS ENCODER**

**MS-7491A**

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